the OIL AND GAS JOURNAL

NOVEMBER 17, 1958

Special News Report

Begins on Page 115

ALSO—

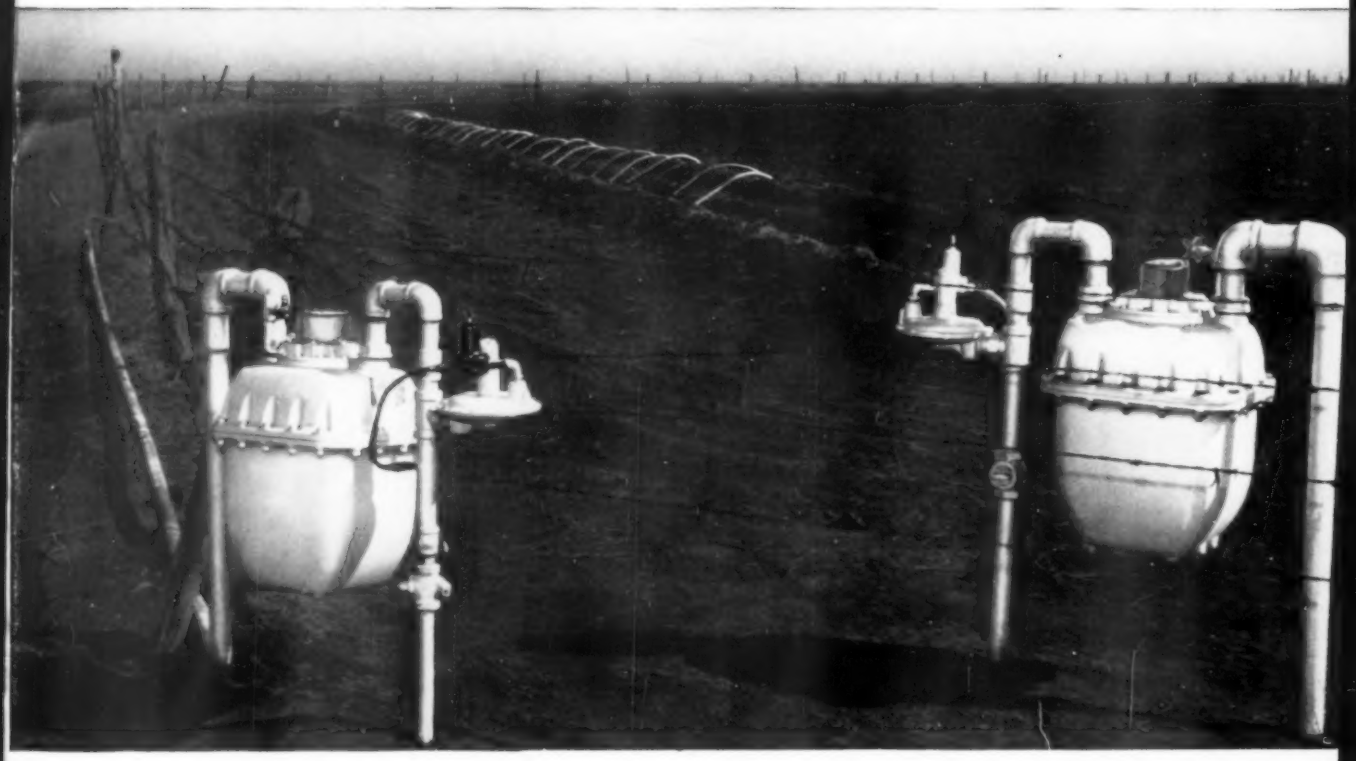
Understanding Process Flowsheets p. 151

Dents in Pipe Spell Trouble p. 155

Are All These Dry Holes Necessary? p. 298

ONE DOLLAR PER COPY

For irrigation . . . or any field service up to 100 psi



Two Rockwell "1600" meters with Rockwell "173" regulators (gas loaded) serving engines pumping water to irrigated fields in Texas.

Lightweight, Portable, Sturdy

ROCKWELL "1600" ALUMINUM GAS METERS

Whatever your needs for field measurement, you can fill these needs best with the Rockwell "1600." Just consider these advantages. The Rockwell "1600" has a rust-proof, impact-resistant aluminum alloy case. Weighing only 63 lbs., one man can easily carry and install it. Single joint construction reduces the possibility of leakage—simplifies access to the inner mechanism, which is removable and interchangeable as a unit.

There's a generous capacity rating of 1600 cfh at 4 oz. inlet pressure. This capacity can be increased substantially by measuring gas at higher pressures—up to 100 psi. Corrections to base pressure from higher pressures are accomplished by fitting the "1600" with either an Emcorector or a Combined Record gauge. Write for literature. Rockwell Manufacturing Company, Pittsburgh 8, Pa.

ALUMINUM GAS METERS

another fine product by

ROCKWELL

This Rockwell "5000" aluminum meter with Emcorector is the master meter for five irrigation wells, submetered by five Rockwell "1600" meters.

the OIL AND GAS JOURNAL Newsletter

Tulsa, Okla.
Nov. 17, 1958

Feeling at API is that oil has three big problems:

Politics at present is running against oil and business in general. This is mentioned by nearly everyone at Chicago.

New Congress may not be too friendly. Depletion is sure to come up, may become big issue. Prospects are dim for new gas bill unless White House or FPC really push it. On imports historic position of companies will get some recognition.

How to improve oil's political standing? None agree on this. Some contend companies should actively enter politics. Others say oil men as individuals should do the job.

Public relations is a perennial problem. No new answers were given at Chicago. Stressed, however, were: Unity of all industry factions needed...Support new API public-affairs approach, give it time to work...PR is everyone's job.

Cost cutting to make domestic oil competitive is a must for the entire industry. Wider spacing will be pushed in a hot campaign in days ahead...Conservation must be defended... Price cuts are hurting producers and drillers alike, but oil men still are optimistic about 1959 and the years ahead.

▼ ▼ ▼

Argentine Government is in real trouble. Frondizi is moving fast and hard to get upper hand in showdown over his oil and other economic policies.

Oil, an explosive subject in Argentina, is being used by Frondizi opponents to whip up support. Same tactics triggered Peron's fall.

Present regime has imposed a state of siege., arrested 700 communists, Peronists, and nationalists, and confiscated political paper headlined "Peron Denounces Oil Deal." Police have locked up four leaders of striking Mendoza oil workers who have cut off fourth of country's oil production.

Oil workers reacted with a 48-hour, nationwide strike.

Government says oil-development contracts with U. S. firms will not be affected. But talks underway with Atlas Corp. have been extended 30 days in hope tempers will cool off.

▼ ▼ ▼

Quick look at the industry: Cabinet committee hopes to

have substitute imports plan ready within 2 weeks. It'll replace Carson plan...Texas gas producers are happier. Lone Star Gas is granting 3-cent an M.c.f. price increase...OCAW and Sinclair reopen stalled wage talks in Kansas City this week—oil unions over country are taking strike votes to give their negotiators a stronger voice...Canada's controversial Borden Commission report has picked up opposition from Imperial, the nation's biggest oil company...Japanese have signed up two drilling firms, International Drilling and Reading & Bates, for work in Persian Gulf.

▼ ▼ ▼

Are we running out of oil men?

Some bankers in the Southwest express concern at what they feel is a general trend of oil-producing properties away from the small independent.

A very high percentage of their oil loans in recent months has been to groups or syndicates for purchasing properties. These in turn tend to sell to larger independents or to the majors.

Drop in oil exports is putting squeeze on Canadian producers. And there's no immediate relief in sight.

Crude moving to U. S. Pacific Northwest has dwindled to 11,500 bbl. daily. That's a mere trickle of the 80,000 bbl. daily Alberta producers feel they should logically market in this area. And present shipment wouldn't exist except for a swap arranged between American and Eastern Canadian refiners.

Canada's plight also is shown by deliveries from pipelines. They are down 6% from a year ago—all due to reduced exports. August export figure was 2.2 million barrels, less than half the 1957 volume.

Oil-imports worries are not confined to this country.

The powerful British coal-mining group plans to campaign for a reduction of oil imports there. Coal is worried by inroads of oil on its traditional markets.

Unsold coal stocks have doubled in the last year to 17 million tons while oil imports have risen 13% to nearly 820,000 bbl. daily, including 160,000 bbl. daily reexported as products.

▼ ▼ ▼

Here's an idea for new drilling business: Offer turnkey jobs even on the deep wells.

An East Texas drilling contractor has such an arrangement with a major company in southern Mississippi. It is proving profitable for both.

The contractor drills the hole, logs it, runs pipe, perforates, and brings the well into the tanks. The operator

furnishes only the pipe and pays a flat sum for the job.

Engineers for the major say they're pleased with the work, estimate the company saves $40,000 on each of the two wells drilled to 9,750 ft. They plan to give the contractor more of their business on the same basis.

Turnkey drilling is not new, of course. But it's rare at such depths, and it's unusual for a major to buy a turnkey job.

A unique tunneling technique for development of two California offshore leases is being studied.

Looking into the novel idea is a group of individuals within the Phillips-Pauley syndicate.

Tunneling under the ocean for developing coal fields has been practiced for years in England.

Prospective offshore operators in California generally have been willing to look at any new idea for developing their leases because of 100-ft. plus water depths within a mile or so from shore.

▼ ▼ ▼

Central Kentucky's big shallow boom is still fired up.

Latest reports show 600 wells at Greensburg field with production of 13,000 bbl. daily from 400-600 ft. depths. Pay is the upper Silurian dolomite or "blue band."

Operators have from 85 to 100 cable-tool rigs working the area. Spacing is fence-post close. Salt-water disposal, however, is becoming a major headache.

Two Oklahoma wildcats bear close watching. Both point to future development in relatively oil-barren areas.

Kingfisher County has a prolific Manning discovery at Jones, Shelburne & Pellow's 1 Myers. Well flowed 50 bbl. per hour on tests. Location is in area of little activity west of Nemaha ridge, and its success has stirred keen interest.

Harper County has a second producer in its promising North Buffalo field. Sinclair's 1 Rosa Lee Kuhn made 248 bbl. of oil daily from Kansas City formation, 211 bbl. daily from Oswego, and 572 bbl. daily from Lansing. Well is a ½-mile north offset to the 1 Holcomb, a 400-bbl. daily Arbuckle producer, considered one of the year's highlight finds in northwest Anadarko basin.

Don't write off the cancellation of MenHall-Atlantic-Portsmouth concession in Syria as a total loss.

Under Syrian petroleum law, operators who found Syria's first oil are entitled to royalties—at a rate to be negotiated later.

In oil circles, Syria's denial of a development concession and cancellation of the exploration concession was considered high handed and an act of bad faith.

Syria may redeem itself in oil industry eyes by a fair royalty settlement.

Drilling notes: Delhi-Taylor has staked wildcat on a large dome in South Australia. Nearest drilling is a 5,000-ft. water well which has gas bubbles...Brazil has signed contract with American drilling contractor for 25 wells in Maceio. Bids were made on footage basis with pay in U. S. dollars...CATC's wild offshore wells may be killed this week when three rigs pierce producing formations and inject salt water, sand, and cement for the kill.

▼ ▼ ▼

Automation on liquid pipelines is growing fast.

API committee survey shows that of 37 firms contacted one in five remotely operate crude-pump stations and one in three remotely operate products-pump stations.

Remote control of gas-line stations will be common practice in 5 to 10 years. First push-button gas line, Gulf Interstate, came into being this year. Proposed Transwestern line is designed for complete remote control.

Closed-circuit TV has been put to work monitoring pipeline custody-transfer installations. Same idea has been used in gasoline plants.

This application of slow-scan TV promises to become big money saver in remote monitoring.

▼ ▼ ▼

Air Force soon may drop opposition to asphalt for its runways. This would open a big market for the product.

Army Engineers tested asphalt at Columbus, Miss., base in September, found it okay, and will so report to Air Force. Now for the first time, asphalt manufacturers feel optimistic about altering Air Force's anti-asphalt attitudes.

The 1960-model autos may have more horsepower and higher compression ratios.

And between now and then refiners may start shoving up octanes again.

Key to these events is what's happening to gasoline on the West Coast. Presence of three 100-plus-octane premium brands has moved gasoline quality there among the best. Traditionally West Coast gasoline has been low octane.

Ethyl survey shows gasoline in six West Coast cities tops national average for octanes—98.9 RON compared with 98.7 for nation (p. 144).

Auto makers no longer will be forced to keep compression ratios down to West Coast gasoline quality. Had this development taken place earlier this year, Detroit might not have soft pedaled higher fuel requirements in 1959 models.

The Oil and Gas Journal is published weekly with an additional issue in January by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa 3, Okla. Second-class postage paid at Tulsa, Okla. United States and Foreign rates to the petroleum industry, 1 year $5, 2 years $8, 3 years $10.

OLIVER

OC-12 POWER-TURN CRAWLER

Saves time and money on every job!

POWER-TURN does it! Gives you full power on both tracks—all the time!

In dozing and angleblade work you lose no traction on the turns, whether they're sharp or gradual. You can handle side draft loads with no drift. On grading or backfilling jobs you'll make full use of 61.5 diesel h.p. and four travel speeds to work faster every minute of the day. And POWER-TURN is actually simpler, easier to operate, more dependable.

Find out for yourself how much time and money POWER-TURN can save you. Visit your Oliver Distributor.

OC-12 SIDE BOOM—all hydraulic with a lifting capacity of 13,000 lbs. With only two simple controls you raise or lower boom, operate hoist, and control cable speed with precision and safety. Available with winch.

OLIVER **THE OLIVER CORPORATION**

Industrial Division, 19300 Euclid Avenue, Cleveland 17, Ohio

a complete line of industrial wheel and crawler tractors and matched allied equipment

the OIL AND GAS JOURNAL

NOVEMBER 17, 1958 • VOLUME 56 • NUMBER 46

TULSA OFFICE
211 South Cheyenne Ave.
Phone LUther 4-4411

THE STAFF

George H. Weber ..... Editor
Henry D. Ralph ..... Chief Editorial Writer
Ted A. Armstrong ..... News Editor
Gerald L. Farrar ..... Engineering Editor
Dr. Frank J. Gardner ..... Exploration Editor
Paul Reed ..... Pipeline Editor
John C. Reidel ..... Petrochemical Editor
W. L. Nelson ..... Technical Editor
Lynn M. Nichols ..... Presentation Editor
John C. Casper ..... Economics Editor
W. B. Bleakley ..... Production Editor
Neil Williams ..... Associate Editor
Carl J. Lawrence ..... Assistant News Editor
Gene T. Kinney ..... Assistant Pipeline Editor
R. B. Tuttle ..... Equipment Editor
C. Dudley Johnston ..... Art Director
Carl Hoot ..... District Editor
John C. McCaslin ..... District Editor
W. A. Bachman ..... District Editor
Robert B. Bizal ..... District Editor
Deacon New ..... District Editor
Sara Bangert ..... District Editor
LaWanda Turner ..... Readership Research
Max L. Batchelder ..... Asst. Pres. Editor
Helen Brown ..... Editorial Assistant
Alice Burt ..... Editorial Assistant
Aileen Cantrell ..... Editorial Assistant
Susan Boeckman ..... Editorial Assistant
Margaret Higgs ..... Editorial Assistant
Jo Jeanne Speaker ..... Staff Artist
E. P. Stadler ..... Staff Artist

NEW YORK OFFICE
500 Fifth Avenue
Phone LOngacre 4-6160

Paul Swain ..... International Editor
Larry Resen ..... Refining Editor
Ray G. Gibson ..... District Editor
John P. O'Donnell ..... District Editor

HOUSTON OFFICE
802 American Investors Building
Phone CApitol 4-7726

Ed McGhee ..... Drilling Editor
Howard M. Wilson ..... District Editor

DALLAS OFFICE
1238 Mercantile Bldg.
Phone Riverside 8-3074

Robert J. Enright ..... District Editor

LOS ANGELES OFFICE
650 South Grand Avenue
Phone MAdison 2-0722

D. H. Stormont ..... West Coast Editor
William T. Smith ..... District Editor

WASHINGTON OFFICE
621 Albee Building
Phone District 7-1710

Bertram F. Linz ..... District Editor
Joe Reilly ..... District Editor

Correspondents at Denver, Pittsburgh, Calgary, Columbus, Ashland, Ky., Oil City, Pa., Mount Pleasant, Mich., Melbourne, Australia; Regina, Sask.; Chatham, Ont.; Casper, Wyo., and Anchorage Alaska.

POSTMASTER: Send notification (Form 3579) regarding undeliverable magazines to The Oil and Gas Journal, 211 S. Cheyenne, Tulsa 3, Okla.

SUBSCRIBERS: Send subscription correspondence and change of address to The Oil and Gas Journal, 211 S. Cheyenne, Tulsa 3, Okla. Subscribers should notify publisher promptly of any change of address, giving old as well as new address, and including city postal delivery zone, if any. If possible, enclose an address label from a recent issue of the magazine. Allow one month to six weeks for change to become effective.

IN THE NEWS

From the API:

Annual Meeting Was Less Technical, More Political 115
It's Time Oil Men Began Defending Themselves, Porter Says 117
Oil Unity a Must, Rodgers Says in Gold Medal Speech 118
Get Into Politics as Individuals, Romney Advises 119
Four New Vice Presidents Elected 120
Inflation Cures Are Often Worse than the Disease 122
Oil Has a Lousy Reputation, News Men Tell Oil Men 123
New Oil Will Be Found in Abundance, Morgan Davis Says 124
Public Affairs Committee Outlines Three-Point Program 125
Demand to Climb Steadily Through 1975, Cadle Predicts 126
FPC Needs Help of Producers in Determining Gas Costs 128
There's Plenty of Flexibility in Refining Today 130
Transportation Group Studies Trends in Pipelining 131
More Courage Is Needed to Cut Industry Costs 132

General Interest:

Oil Committees May Change Complexion in New Congress 133
CATC Nears Climax in Move to Choke Off Wild Wells 137
West Central Texas Gas Prices Increase 138
Cabinet Import-Control Plan Expected Soon 139
Louisiana Legislature May Change Gas Tax Law 139
West Coast Gasoline Quality Tops National Average 144
Sinclair and OCAW to Start Wage Talks This Week 146

Pipelining:

Imperial Sees Threat to Industry in Borden Report 146
Burt Hull, Builder of Big Inch and Tapline, Dies in Dallas 141
Competitors for Middle West Gas Markets Change Plans 143

Foreign News:

Newcomers Are Hitting Pay Dirt in Lake Maracaibo 147
Argentine Oil Workers Strike in Protest Against Contractors 149
Two Drilling Contractors Sew Up Neutral Zone Deal 150

Drilling-Production:

Some Bright Spots Seen in Aneth Area Shutdown 134
California Platform Has Unique Waste-Cleaning System 135
Humble Demonstrates "Multiple, Tubingless Completions" 136
New Techniques Needed to Drill Superdeep Hole 138

Exploration:

Texas Gulf Coast Field Chalks Up Another Huge Well 140
Powder River Stages a Repeat Performance 297
Were All Those Dry Holes Necessary? 298

OIL AND GAS PIPELINES • REFINING • PETROCHEMICALS
EXPLORATION • DRILLING • PRODUCTION • FIELD PROCESSING

. . . an integrated magazine serving an integrated industry

TECHNOLOGY—OPERATION

Refining-Processing

What You Ought to Know About Process Flowsheets . . . 151

By D. J. Oriolo

Here's a basis for better understanding between the designer who must prepare them and the operator who must use them. A tabulation of equipment symbols should insure more uniform flowsheets. Preparation of the process flowsheet is the first major step in the over-all design of process facilities. It must present the process accurately and clearly.

How Pump-Startup Problem Was Solved . . . 182

By Larry Resen

Installation of a bypass and utilization of an existing water-wash system eliminated a troublesome startup program on a pump in light-hydrocarbon service. The pump is used to charge feed stock to the polymerization unit at Pure's Nederland, Tex., refinery.

Questions on Technology . . . 185

Process Costimating . . . 187

Drilling-Production

Wetting Agent Reduces Pipe Sticking in Drilling . . . 165

By N. K. Tschirley and K. D. Tanner

Three muds which were already considered good emulsions each had a wetting agent added to it. Result was that pipe drag was eliminated in the three wells. Use of the wetting agent is not limited to low-solids muds.

Downhole Power Speeds Drilling . . . 172

By Ross W. Colebrook

Downhole mud-operated devices such as jet bits, reciprocating motors or turbines, or positive-displacement rotating motors can increase the hydraulic power used at the bottom of the hole. To get maximum downhole power, mud-system losses must be reduced as much as possible and downhole device must be matched to the rest of the system.

Safety Rules Can Cut Air and Gas Drilling Hazards . . . 189

If drilling crews and service-company personnel are properly schooled in safety, and if proper drilling equipment is available, there are few hazards in air and gas drilling.

Electric-Log Interpretation Is Easier with Nomographs . . . 193

By S. H. Southwick, J. K. Kerver, and W. O. Winsauer

A qualitative method of electric-log interpretations based on nomographs has been found applicable to both clean and shaly formations. It gives good representation of potential and resistivity data on clean and shaly rocks which contain formation waters of high or low salinities.

Pipelining

How Dents in Pipe Can Affect Service Performance of Lines . . . 155

By S. P. Belonos and R. S. Ryan

Tests demonstrate that the metal in and adjacent to the dent contains some residual stresses even though the metal yields. The magnitude of this residual stress, obtained by the use of strain gages, increases with depth of dent and decreases with dent area.

How Westcoast Crossed the River . . . 215

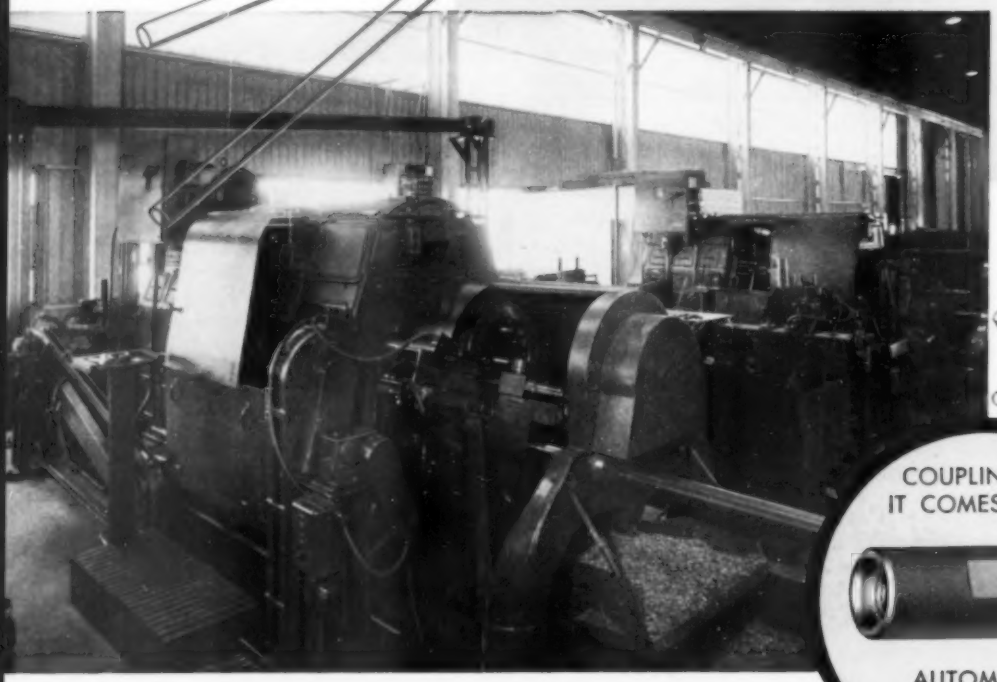
The company used pipe exclusively in the supporting towers for two exceptionally long major suspension crossings over the Peace and Fraser rivers in British Columbia. These are to be the only major long crossings so constructed.

DEPARTMENTS

They Say . . . 103
Calendar of Events . . . 105
Journally Speaking . . . 109
Editorial . . . 111
Watching Washington . . . 145
Foreign News . . . 147
Book Review . . . 161
Questions on Technology . . . 185
Process Costimating . . . 187
Drilling Contractors . . . 211
On the Job . . . Pipelining . . . 215
New Equipment . . . 250
Trade Literature . . . 265
Equipment Men in the News . . . 273
Exploration Highlights . . . 297
Personals . . . 329
Deaths in the News . . . 332
Statistical Summary . . . 334
Drilling Statistics . . . 335
Supply Statistics . . . 336
Refining Statistics . . . 337
Markets . . . 338
Classified Advertising . . . 339
Advertisers' Index . . . 343

MECHANICAL MARVEL

makes Sucker Rod Couplings on Push-button Orders



. . . in LARGEST, MOST MODERN SUCKER ROD PLANT in the Oil Industry!

Mechanics is not always *better* than human hands and skills, but it is tireless, rigidly and undeniably systematic, precise and exacting . . . and this method lends itself best to full employment and exploitation of all types of controls and governors: electric, electronic, mechanical, hydraulic, pneumatic, or combinations thereof . . . and each has its selected function.

Such a method reserves to human judgment its best function:

supervision — inspection — checking — testing — final inspection, approval, and *acceptance* of only the *superlative* in product.

From the random length cold-rolled round stock, through every operation, of cut-off, passes and machining finish, the process is fully automated in control.

The couplings from machine-finish go to an automatic 8-spindle tapper for full through-threading (assuring definitive axial alignment), thence to final inspection, before induction hardening, completing a product without a peer, qualified to carry the API stamp and the NORRIS Label of Excellence.

SKILLED HANDS AND ULTRA PRECISION GAUGES MAKE THE FINAL CHECK ON EVERY NORRIS ROD COUPLING

Your Supply Store Is Our Distributor

W. C. NORRIS, MANUFACTURER

DIVISION OF DOVER CORPORATION

TULSA, OKLAHOMA

BRANCHES: GREAT BEND, KANSAS; CORPUS CHRISTI, HOUSTON, KILGORE, ODESSA, WICHITA FALLS, TEXAS; OKLAHOMA CITY, OKLAHOMA; SALEM, ILLINOIS; CASPER, WYOMING; FARMINGTON, NEW MEXICO. WEST COAST DIST.: REPUBLIC SUPPLY CO. OF CALIFORNIA, LOS ANGELES.

B.F.Goodrich

Hose that goes to blazes shouldn't blow out

B.F.Goodrich improvements in rubber brought extra benefits

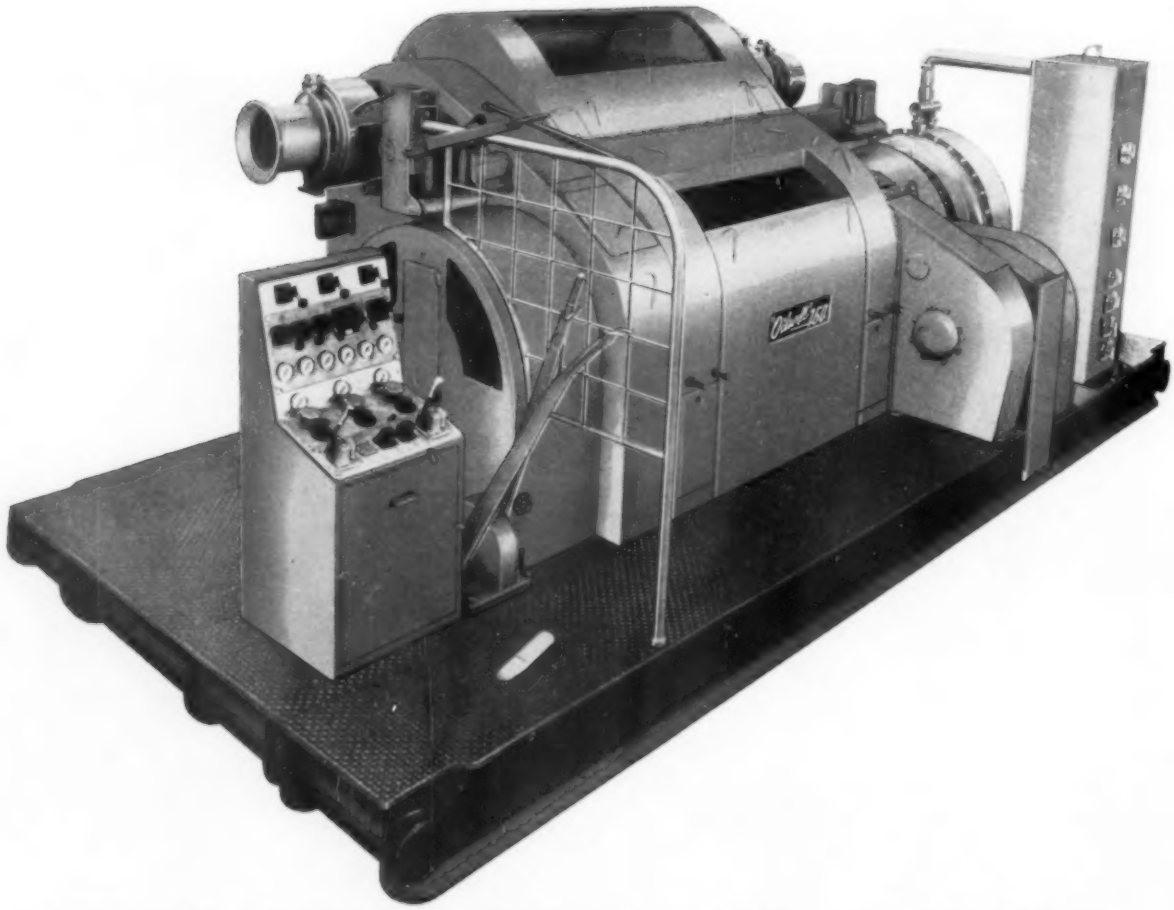
At this oil refinery fire, hose lines took a terrific beating. Heavy fire trucks, tractors, even bulldozers, ran over it, crushed it. Some kinds of hose were so weakened by the pounding that they burst. But while ordinary fire hose was popping all over the place, not one length of the six thousand feet of B.F.Goodrich hose in use blew out.

B.F.Goodrich engineers long ago set out to design a hose that could stand this sort of punishment. They used Dacron in the woven jacket that increases hose strength 50%—and does it with a 22% saving in weight, and without loss of water capacity. They also buried a reinforcing layer of cord in the rubber at each end of the hose, where most breaks occur.

Today, fire trucks can carry a third more hose, and firemen can get it off the trucks and into action faster because B.F.Goodrich found this new way to make fire hose lighter, more flexible without sacrificing strength.

Superseal treatment is another safety factor that can be specified. This exclusive B.F.Goodrich treatment gives fire hose 10 times more resistance to mildew and rotting than ordinary treatments. And, most important, the Superseal treatment costs no more than ordinary treatments. Your local B.F.Goodrich distributor can give you more information, or write *B.F.Goodrich Industrial Products Company, Dept. M-466, Akron 18, Ohio.*

B.F.Goodrich *fire hose*



Here's the latest Draw Works for medium-depth drilling

the OUTSTANDING "Oilwell" 760

"Oilwell's" 760 Draw Works represents another outstanding engineering achievement in the field of heavy-duty drilling equipment.

In addition to the emphasis on strength with mobility, the 760 is designed to cut maintenance costs and down time. The housing has oil-tight, quick-opening inspection doors at just the right places for easy access to every maintenance point.

Shaft assemblies are designed for speedy removal when necessary. Spacious openings to the transmission area with staggered mounting of input and output transmission shafts makes everything easy to reach when chains need servicing.

Identical Fawick Airflex ventilated constricting-type clutches are used on both high and low drums, and the high drum clutch is gap-mounted for easy removal without disturbing the auxiliary brake.

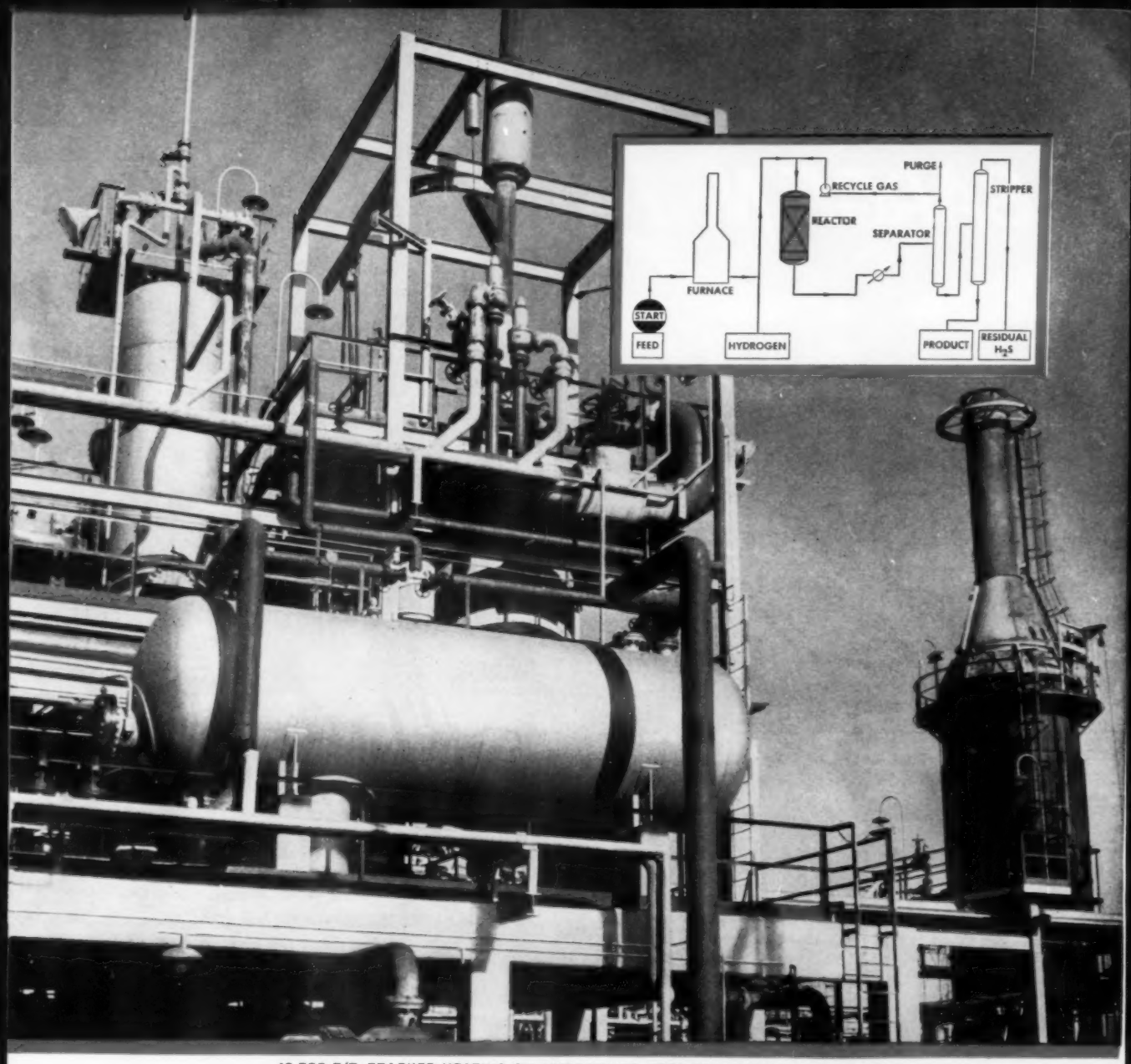
The control console of this new draw works provides the ultimate in convenience for the driller. It gives full air control of all clutching, shifting, and throttling and has *push buttons* to compound engine throttles in any combination for pumping or hoisting. Since the console is a separate unit, it can be serviced easily from either front or back.

If you're looking for economical operation throughout the 7,000-12,000-ft. range in ONE rig, you will get it with the 760. Your nearest "Oilwell" or Wilson Supply Company representative has the story, or, we'll be glad to send an illustrated brochure on this new addition to the "Oilwell" line.

USS and "Oilwell" are registered trademarks

Oil Well Supply Division of USS United States Steel

Executive Offices—Dallas, Texas • Export Office—30 Rockefeller Plaza, New York 20, N. Y.



19,500 B/D CRACKED HEATING OIL HYDROFINER, ESSO STANDARD'S BAYWAY REFINERY, LINDEN, N. J.

HYDROFINING CAN GIVE YOU TOP PERFORMANCE AT LOWEST INVESTMENT

Esso Research and Engineering offers you *Hydrofining*, a process now being applied to a greater variety of feed than any other hydrogen-treating process. *Hydrofining* uses by-product hydrogen to remove sulfur and other impurities *without yield loss*.

The process improves product stability, odor, color and other quality characteristics without the disadvantages of chemical or clay treating methods. *Hydrofining* is another achievement of the Esso Research program — 39 years of new process developments made available to refiners around the world.

Hydrofining experience has been gained from commercial units processing a wide variety of feed stocks such as naphthas, distillate fuels, lubes and waxes. This experience plus years of hydrogenation research gives us a unique opportunity to recommend the best design for your plant.

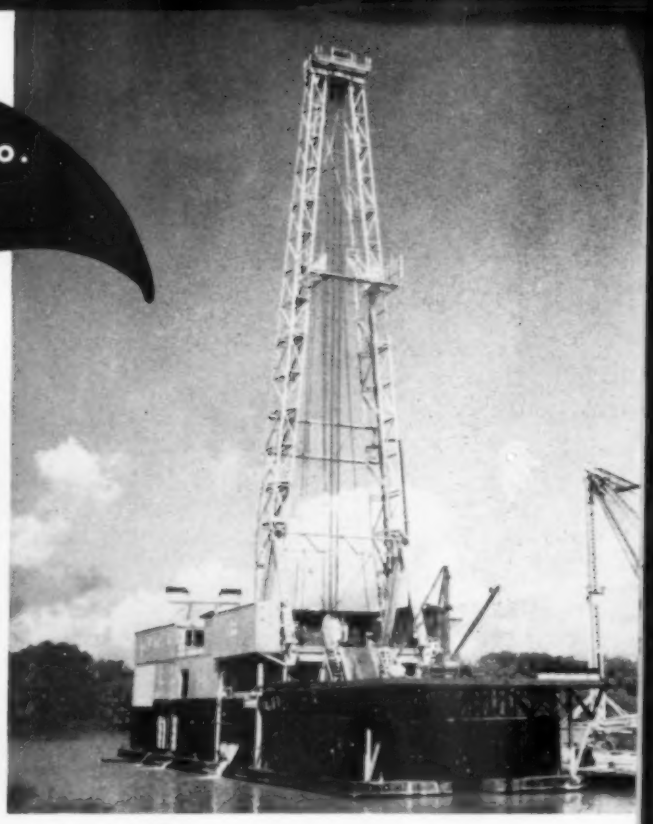
Twenty-three *Hydrofining* installations are on stream; nineteen more are in the construction or planning stage. Licensees enjoy benefits of continuing *Hydrofining* research. *Hydrofining* can play an important part in helping you process previously unattractive stocks into higher quality products. We would welcome your inquiry.

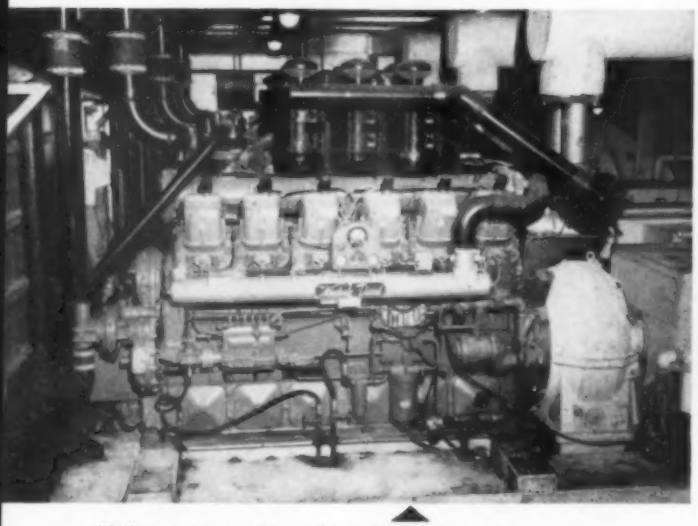
ESSO RESEARCH AND ENGINEERING COMPANY

P.O. Box 243, Elizabeth B, N. J.

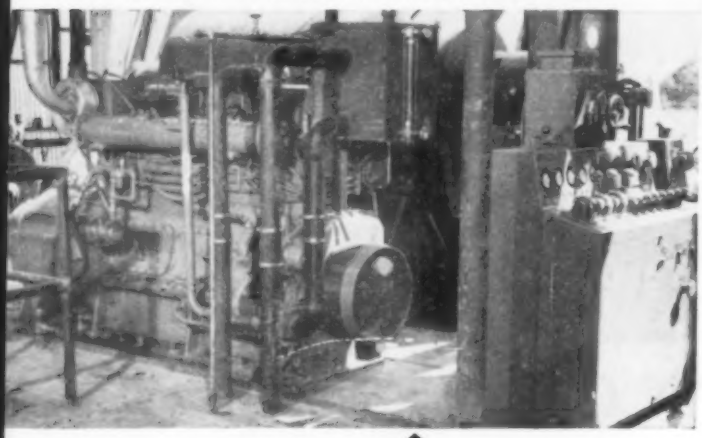
Your key to progress... an Esso Research process

NEW Two-R Drilling Co. BARGE No. 1





(drilling engines—drawworks and mud pumps)
Three Waukesha VLRDBSU Turbocharged 12-cyl. Diesels



(rotary table drive and catworks)
Waukesha NKDBSU Turbocharged Diesel

all-WAUKESHA POWERED

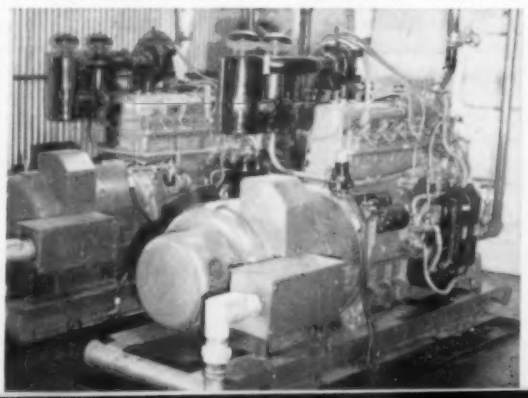
Recently commissioned at Morgan City, La., Barge No. 1 has a 25,000′ capacity drilling rig. The mast, 142′ high x 32′ at base, has 1,000,000 lb. lifting capacity. Barge is completely powered by Waukesha Diesel Engines, each of which has its own heat exchanger-surge tank system. The barge itself is 170′ long, 45′ wide, 12′ deep, with a substructure 24′ high; has living quarters for 22 men. It was built for Bethlehem Supply Co. by Reagan Tool Co. for delivery to Two-R Drilling Co. Reagan Equipment Co. supplied the Waukeshas. Get bulletins.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN
New York • Tulsa • Los Angeles

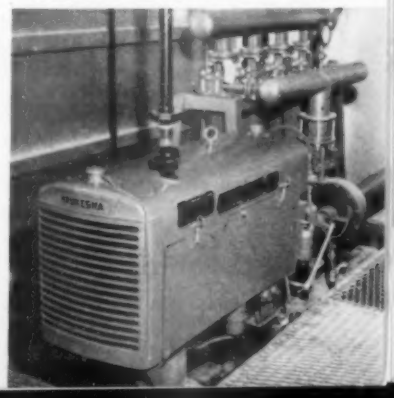
396

(mud mix pump)
Waukesha WAKDU Normal Diesel

(main electrical power) Two Waukesha WAKDBSU
Turbocharged Diesel 125 KW Enginators



(de-sander unit)
Waukesha 190-DLCU Normal Diesel



win the fight against corrosion—with Alcoa Aluminum

Here's a $100-million example. The refining industry's requirements for heat exchanger tubes are 40 ft per barrel of capacity. Some 30 ft of this requirement involves exchanger applications in which Alcoa has proved aluminum is ideal. By using aluminum tubes in all those applications, the refining industry would have saved approximately $37 million in original capital investment. Capitalized at the refining industry's normal rate of return, that saving would be worth about $100 million over a 10-year operating period.

Don't shovel good money after bad by reinstalling unsuitable material. Over 30 years' experience in the process industries has given Alcoa engineers full knowledge of the aluminum alloys and installation methods by which corrosion can be eliminated. Put their knowledge to work for you. Outline your corrosion problems in a letter to ALUMINUM COMPANY OF AMERICA, 904-L Alcoa Building, Pittsburgh 19, Pa.

"ALCOA THEATRE"
Exciting Adventure
Alternate Monday Evenings

ALCOA CHEMICALS

Specify Alcoa Aluminum for
corrosion-free Process Equipment
Pipe & Tube
Tanks, Containers, Trucks & Cars
Plant Structures

You're never stuck with a **GROVE VALVE**

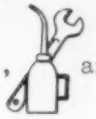
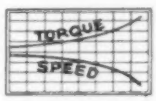
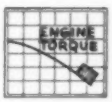
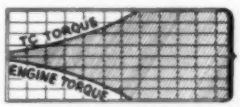
Here's the valve you set and forget. Grove's exclusive Seal-O-Rings wipe out the need for valve lubrication. You're never stuck with valve failure because of forgotten lubricant or depleted sealing compound. The load of lubrication is gone forever. Specify Grove Seal-O-Ring Gate Valves. Under pressure the tightest seal in the line.

Grove valves never require lubrication

GROVE VALVE & REGULATOR COMPANY

6529 Hollis Street, OAKLAND 8, California

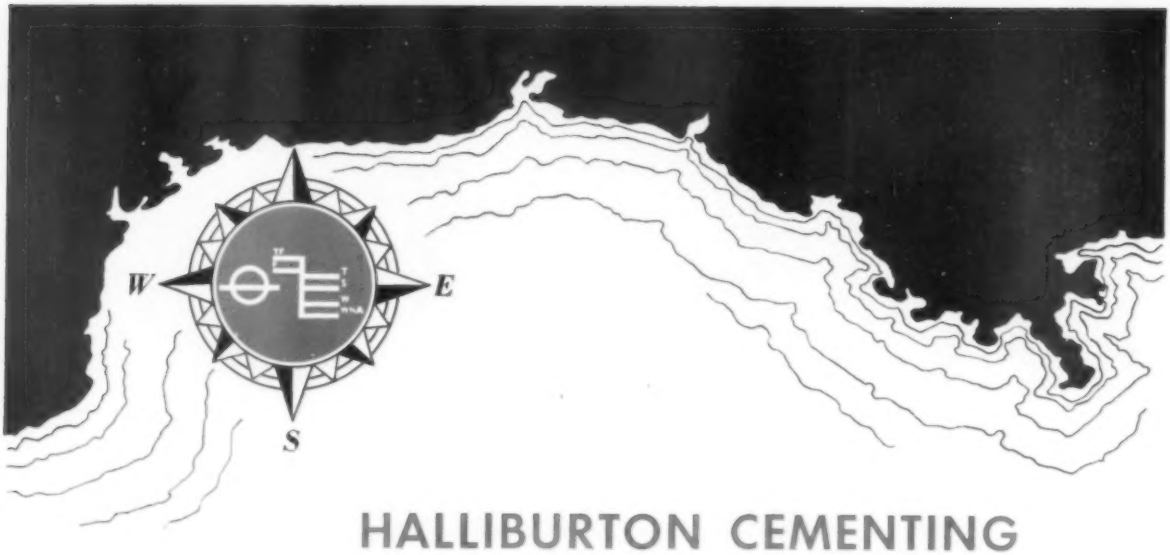
HOUSTON 23—3517 Polk Avenue • LOS ANGELES 6—2559 W. Olympic Blvd.
ODESSA • TULSA • DENVER • CHICAGO • NEW YORK
FARMINGTON, N. M. • LAFAYETTE, LA. • HARVEY, LA. • In Western Canada: GROVE VALVE LTD. EDMONTON

HERE'S HOW AND WHY A NATIONAL TORQUE CONVERTER on your heavy equipment can give you more usable power from your engines, reduce excessive maintenance,  and increase machinery life. When equipment driven by a direct-connected engine is overloaded engine speed drops. So does the "Torque" which is the turning-force delivered by crank-shaft. If the overload continues, the engine stalls and its torque drops to zero. When equipment driven through a NATIONAL TORQUE CONVERTER is overloaded, it cannot stall the engine! Engine speed and engine torque both "level-off" in their most efficient zones, and stay there! The torque-converter shaft slows down but at the same time its torque increases! If equipment overload increases, the converter output shaft finally stalls, but at this point it is delivering maximum torque.  Now if you put the diagram showing how engine torque drops  under equipment overload, with the diagram showing how torque converter torque increases under the same overload, you'll see between the two a  "bonus-power" zone of extra usable power that the NATIONAL TORQUE CONVERTER gives you. Power that makes an oversize engine or "babying" of equipment unnecessary. Furthermore, shocks and strains that batter and age equipment are absorbed in the converter. Machinery lasts longer with less maintenance. If YOU own or operate heavy equipment (with 100 to 1000 hp drives) ask for performance records and recommendations.

THE NATIONAL SUPPLY COMPANY

Subsidiary of Armco Steel Corporation

TWO GATEWAY CENTER, PITTSBURGH, PA.



HALLIBURTON CEMENTING GIVES "ON-SHORE" PROTECTION TO OFFSHORE WELLS

Seagoing oilmen and cementers team up on the toughest of jobs... with onshore effectiveness.

When you call for Halliburton Offshore Cementing Service, specially designed cementing ships carry the same powerful pumps, wide variety of cement, additives and tools... and the kind of experienced cementing crews... that have successfully cemented more wells than any other cementing company in the world.

To be sure of the best in offshore casing and formation protection, call for Halliburton Offshore Cementing Service.

HALLIBURTON

OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA

HIGH COST OF OFFSHORE WELLS MAKES GOOD CEMENTING A MUST!

Good cementing is a must to protect costly casing and minimize remedial operations. That's why more oilmen call for Halliburton offshore cementing from the planning stage to completion. Here are just a few of the tools that help Halliburton's seafaring cementers do an outstanding job.

HALLIBURTON "DV" MULTIPLE STAGE CEMENTER...

For primary cementing of casing string. With one or two "DV" Multiple Stage Cementers, opening and closing plugs, two- and three-stage cementing on the same string is possible... in continuous operation or at intervals... using two or three different types of materials, as desired. Designed for positive fluid shut-off by means of hydraulically operated steel sleeves and high pressure packing.

HALLIBURTON S-3 CASING CENTRALIZER...

Heat-treated, lap-welded springs minimize channeling, and aids in uniform placement of cement around casing... maximum centering efficiency reduces future remedial costs. Specially designed Tubing, Drill Pipe and Slim Hole Casing Centralizers are tailored for specific well conditions.

"DV" MULTIPLE STAGE CEMENTER | S-3 CASING CENTRALIZER | SUPER SEAL FLOATING EQUIPMENT | SELF-FILL DIFFERENTIAL COLLAR

HALLIBURTON SELF-FILL DIFFERENTIAL COLLAR...

Just one, placed in casing string above Super Seal Float Shoe or top Float Collar, allows well fluids to fill casing automatically as it's lowered into well. Highly efficient in deepest wells, even when drilling mud contains high percentage of cuttings and lost circulation materials. New features help provide extra margin of safety from danger of blowout... circulation can be established at intervals while running casing and the Self-Fill Differential Collar continues to operate until sheared by the bottom plug or by dropping a ball... offer greater protection for weak formations... afford reduced running-in time of casing. Very low differential pressure between annulus and inside casing reduces blow-out hazard and formation damage caused by possible "ram-effect". 80 psi differential pressure to operate the valve is standard; 175 psi is optional. Get this dependable, versatile automatic fill-up device for your wells.

HALLIBURTON SUPER SEAL FLOATING EQUIPMENT...

Float Shoes and Float Collars have *more than twice the sealing area* of usual ball-and-seat valves. Provides positive shut-off against back pressure and eases strain on rig while running-in casing. Halliburton *Super Seal Floating Equipment sets the standard for the industry.*

HALLIBURTON HI-DENSE...

A high specific gravity weighting material, Hi-Dense is designed to increase density of cement slurry for controlling high pressure gas and oil zones. It is processed to a fineness requiring a minimum amount of mixing water. Because of the specific gravity of Hi-Dense, it is possible to weight cement slurries to 20 lbs./gal., yet still maintain adequate pumpability and strength stability at higher temperatures.

CEMENTING SERVICES

OFFSHORE SERVICE... A SHORT RUN FROM YOUR RIG

SPECIAL FITTINGS Need *NOT* Delay You

Entire interior and exterior surfaces of special stainless elbows for nuclear power plant are inspected with dye penetrant in search of microscopic surface imperfections. Elbows are 16" O.D. with 102° included angle and long tangent on one end.

Midwest Can Make *and* Deliver

An exclusive and flexible manufacturing process enables us to make welding fittings of any material available in plate that can be worked and welded. As plate is more readily available than pipe, in special materials and thicknesses, deliveries are much better.

Elbows with special included angles, special tangents, special wall thicknesses and of special materials are easily and promptly made. Closer tolerances are inherent in the Midwest process. Quality control always exceeds code requirements . . . can be as comprehensive as you need.

Whether or not you use specials, Midwest Welding Fittings will do a better job for you. Consult your distributor, or write us for new Bulletin 5801.

MIDWEST PIPING COMPANY, INC.

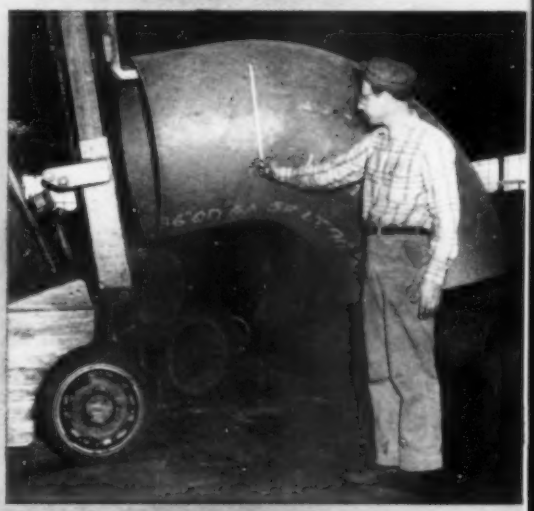
Main Office: St. Louis 3, Mo. (P. O. Box 433)

PLANTS: ST. LOUIS, CLIFTON, N. J. and LOS ANGELES

SALES OFFICES:

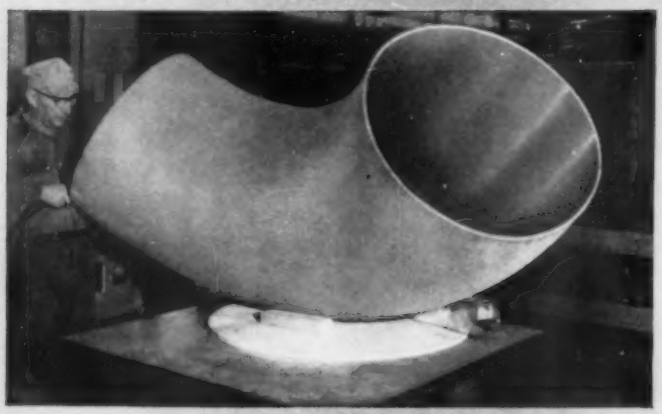
Asheville (Box 446, Skyland, N. C.) • Atlanta 9—72 11th St., N. E. • Boston 27—426 First St. • Chicago 3—79 West Monroe St. • Cleveland 14—616 St. Clair Ave. • Houston 2—1213 Capitol Ave. • Los Angeles 33—520 Anderson St. • Miami 34—2103 Le Jeune Rd. • New York 7—50 Church St. • Pittsburgh 19, Pa.—437 Grant St. • San Francisco 11—420 Market St. • St. Louis 4, Mo.—1450 South Second St. • Tulsa—1640 E. 21st St.

STOCKING DISTRIBUTORS IN ALL PRINCIPAL CITIES



Note the exceptionally long tangent on one end of this 36" O.D. 90° short radius elbow made of special carbon steel. Similar tangent could have been provided on other end if required.

18" O.D. x 1¼" wall 90° elbows (2¼% chrome ½% moly) being sized in compression by totally enclosing dies. The exceptional dimensional accuracy that results is possible only with the Midwest process.



Interior surface of 30" O.D. stainless steel welding elbow for liquid sodium nuclear system required a finish of 125 micro-inches or better.

8060

MIDWEST WELDING FITTINGS

IMPROVE PIPING DESIGN and REDUCE COSTS

EYEING ETHYLENE? $$$$$$$$$$$$$$$ MEET NAPHTHA!

● With the ever increasing demand for ethylene, now is the time for producers to take a long look at naphtha—a raw material that is not only practical but rapidly becoming more and more plentiful.

● Kellogg offers an unequalled background in processes and plants for the production of high-purity ethylene directly from naphtha and other liquid petroleum fractions, as well as for the recovery of ethylene.

● Utilizing its unique steam pyrolysis process, Kellogg has engineered and built nine ethylene-from-naphtha plants for leading chemical manufacturers in various parts of Europe.

● In the U.S.A. Kellogg has engineered and built a naphtha cracking plant on the Gulf Coast, and has made several economic studies in this country on naphtha and other liquid feedstocks for ethylene.

● Kellogg welcomes the opportunity to discuss with you in detail the many advantages of its steam pyrolysis process.

M KELLOGG W

THE M. W. KELLOGG COMPANY, 711 THIRD AVENUE, NEW YORK 17

A SUBSIDIARY OF PULLMAN INCORPORATED

The Canadian Kellogg Company Ltd., Toronto • Kellogg International Corp., London • Kellogg Pan American Corp., New York
Societe Kellogg, Paris • Companhia Kellogg Brasileira, Rio de Janeiro • Compania Kellogg de Venezuela, Caracas

Selecting A Motor Drive For A Hazardous Area?

Here's how

TEIGF motors

by E-M

provide safe, dependable, economical power

Faced with the problem of driving hydrogen compressors in atmospheres which might contain hydrocarbons at their Baltimore refinery, engineers of Esso Standard Oil Company turned to TEIGF (Totally Enclosed Inert Gas Filled) Motors. Horsepower requirements exceeded the practicable limits under which explosion-proof motors could be used.

An important consideration was getting the greatest possible drive economy while operating safely in a possible hydrogen atmosphere. Three E-M 350 hp, 390 rpm TEIGF Motors are on duty at Esso Standard Oil Company fulfilling these important qualifications.

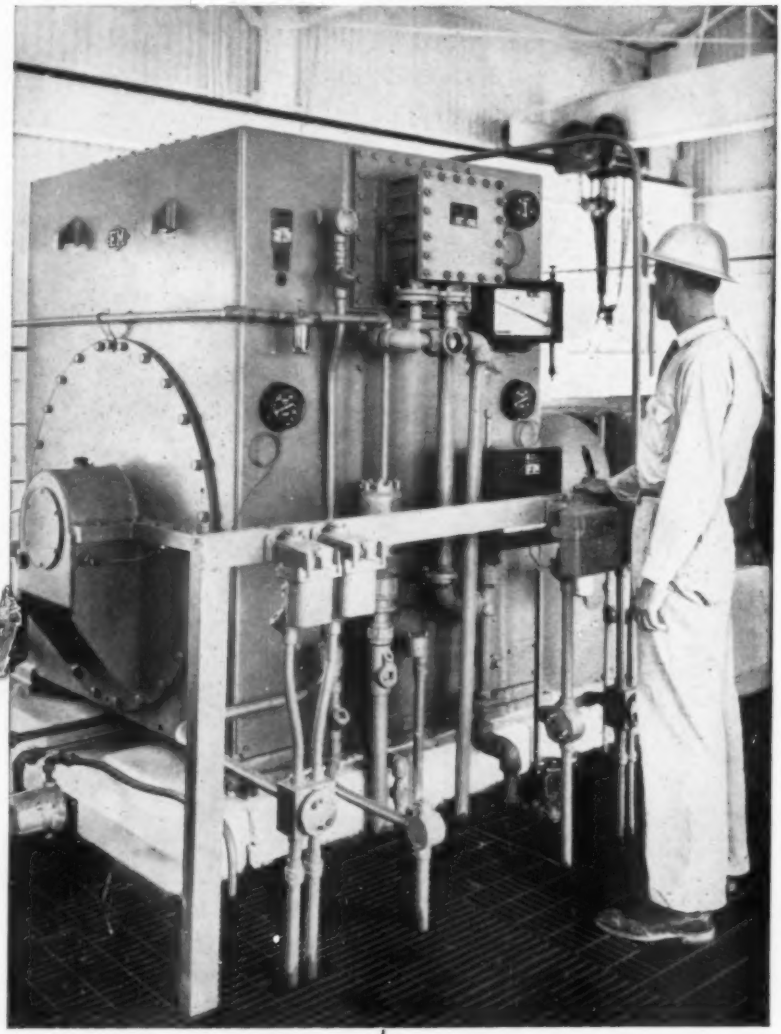
For Esso Standard Oil Company and other companies with similar problems, these E-M Motors offer three main groups of advantages:

1. **SAFETY** — Within the motor enclosure, inert gas pressure above atmospheric keeps explosive hydrogen out. A series of features help accomplish complete safety . . . inert gas pressure gauges . . . temperature gauges . . . purging valves, etc. and a full line of optional equipment. The E-M TEIGF Motor can be "customized" to meet your needs exactly.

2. **RUGGED DEPENDABILITY.** E-M uses specially designed "box type" frames of heavy-duty plate steel reinforced with heavy bar-stock ribs. They cannot twist or distort. Air gap is accurate and permanent, as all frame welding is completed before precision boring. Ventilating gas passages are carefully engineered to provide unimpeded gas flow for optimum cooling.

3. **ECONOMICAL OPERATION.** In E-M TEIGF Motors, gas loss is lower than commercially accepted standards. Specially designed shaft seals are oil-pressure gas-sealed bearing type, virtually non-wearing. Where bolts enter outside casing, E-M engineers specify blind holes . . . tapping and drilling are done *into* casing, not through. Operating and maintenance costs are at a minimum.

Consult your nearest E-M sales engineer, or write the factory for TEIGF Motor Bulletin No. 226.



TYPICAL STANDARD FEATURES INCLUDE:

1. Top-mounted gas-to-water cooler for use with suitable cooling water supply.
2. Forced-feed lubricated bearings and oil-pressure gas seals.
3. Oil pump, motor and oil filter. (Can be supplied optionally inside enclosure.)
4. Inert-gas temperature gauge.
5. Inert-gas pressure gauge.

(additional features shown in Bulletin No. 226)

TYPICAL OPTIONAL FEATURES INCLUDE:

1. Water cooler with double-tube construction for added protection against leakage.
2. Liquid level detector switch. Accumulation of moisture within motor sounds alarm or shuts down motor.
3. Bearing temperature relays, to sound alarm or shut down motor.
4. Explosion-proof motor terminal pothead or inert-gas filled terminal box.
5. Water flow indicator. Can be adapted for use with pneumatic-type regulating device.

ELECTRIC MACHINERY MFG. COMPANY

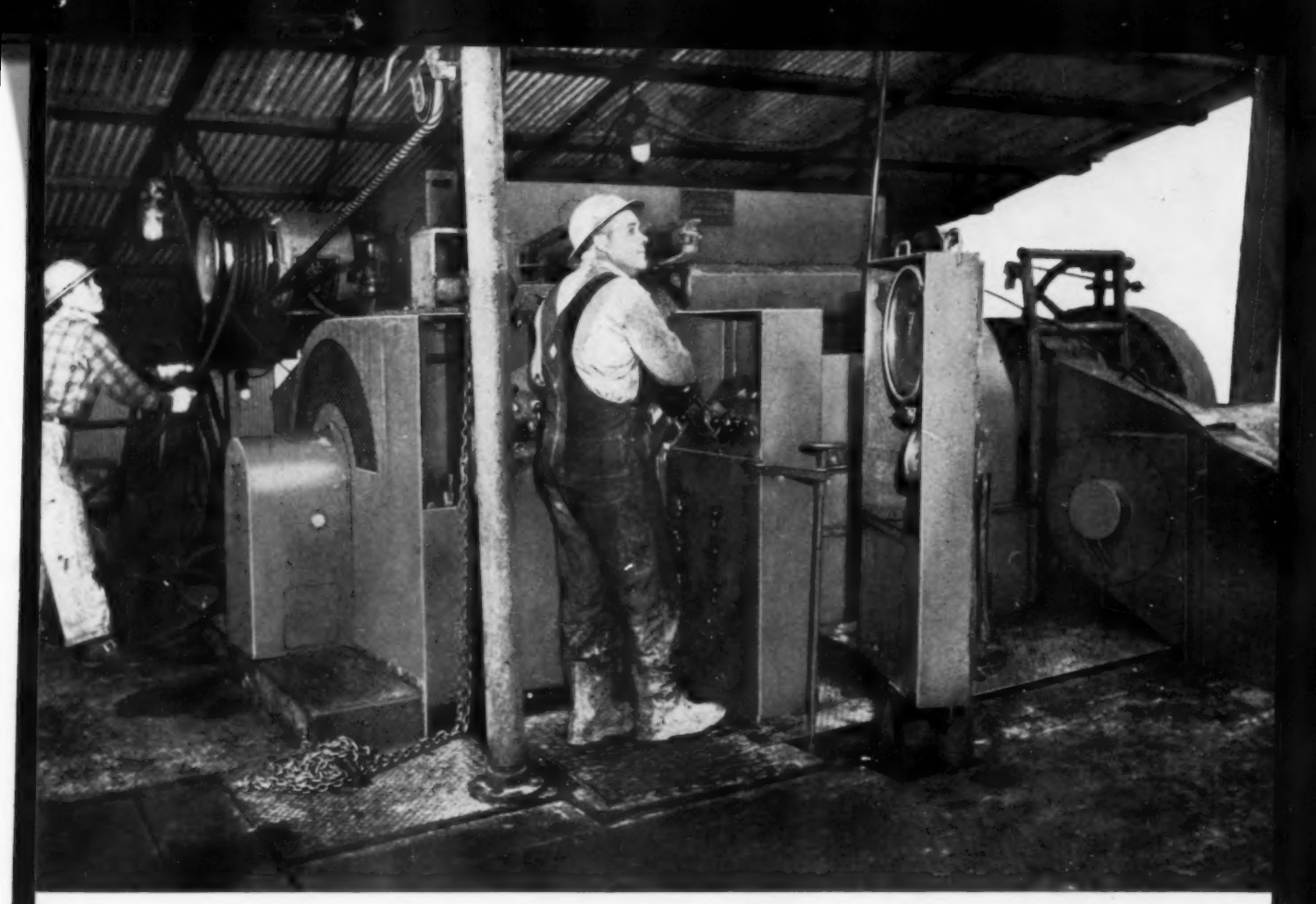
MINNEAPOLIS 13, MINNESOTA

Specialists in making motors do

EXACTLY WHAT YOU WANT THEM TO

E-M

1300—TPA—2179



Go deep...go fast with the **BETHLEHEM 1013**

In deep-hole drilling, no other rig outperforms the Bethlehem 1013. It's a heavy-duty rig designed and built to make hole fast.

The 1013 has Bethlehem air friction clutches with a high safety factor, massive shafts, and extra-large water-cooled brakes. Full capacity can be utilized with any type of drive—mechanical, hydraulic torque-converter, hydraulic coupling, electric coupling or electric motor. Engine compounding elements are available for any number of prime movers, and they can be furnished with one or two pump drives. A two-speed pump drive is available.

Bethlehem engineers will gladly supply performance data. Call or write our nearest office.

HIGHLIGHTS OF BETHLEHEM'S 1013 DRAWWORKS

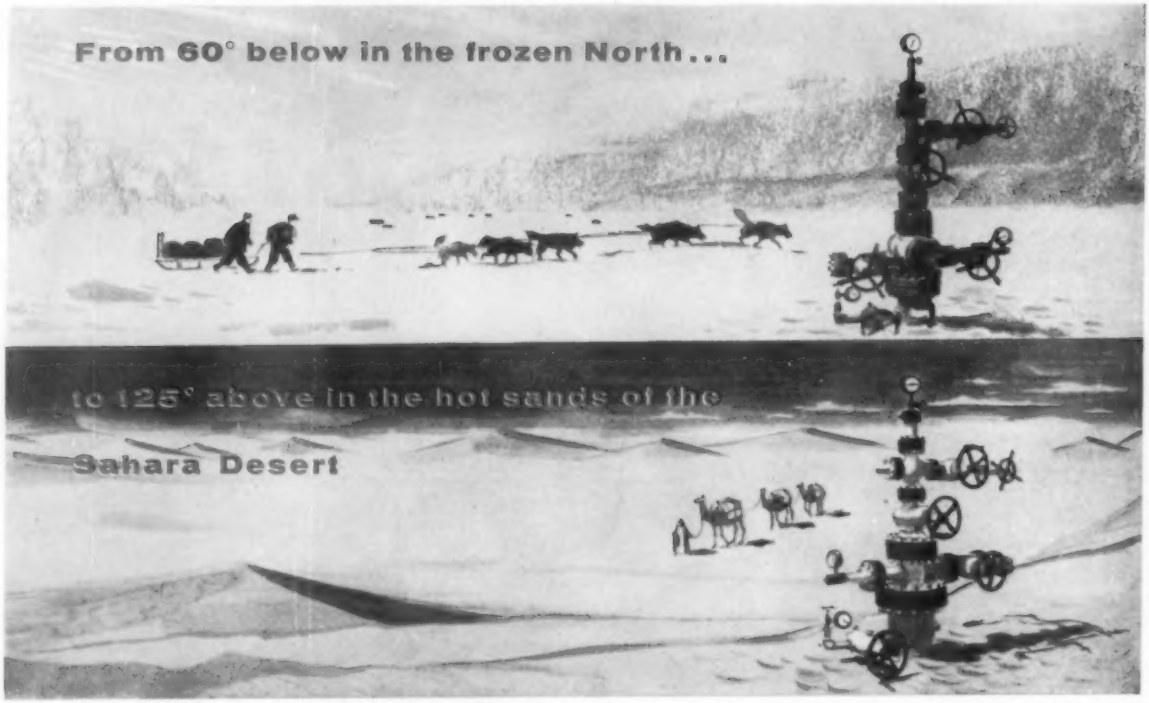
Recommended input hp to transmission	1500*
Number of hoisting speeds	6
Number of rotary speeds	3
Number of reverse speeds	2
Brake rim diam and width, in.	52 x 12½
Arc of brake lining contact, degrees	330
Length of drum spool, in.	50
Diam of drum spool, in.—grooved	28
Low-speed drum clutch working cap., ft-lb	102,000
High-speed drum clutch working cap., ft-lb	59,000
Drum shaft diam, in.	9⅜
Rotary clutch torque cap., ft-lb	16,000
Shaft bearings, type	Self-aligning roller
Upper drum	Optional

*Additional horsepower can be provided to drive mud pumps or auxiliary equipment.

BETHLEHEM SUPPLY COMPANY
General Offices: 21 E. Second St., Tulsa, Okla.
West Coast Headquarters: Los Angeles, Calif.
Canadian Distributor: Bethlehem Supply Company of Canada, Ltd.
Calgary, Alberta, Canada
Export Office: Bethlehem Supply Company (Export Division)
25 Broadway, New York, N. Y.

BETHLEHEM STEEL

BETHLEHEM SUPPLY

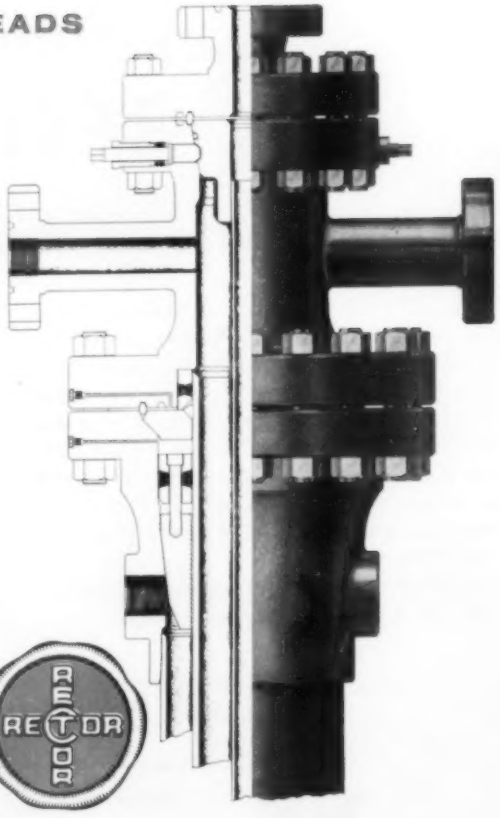


RECTOR

Metal-to-Metal Seal CASING HEADS give the best performance.

Neither cold nor heat nor humidity can cause a Rector metal-to-metal seal Rectorhead to fail. In temperature ranges from 60° below zero to 850° Fahrenheit Rectorhead continues to out-perform all others. When you use Rectorheads you "seal-with-steel". The welded seal, plus API ring gasket, does not require replacement or maintenance. It is immune to corrosion inhibitors, will not "flow" under high temperatures nor freeze under low temperatures

Specify a Rectorhead and "seal-with-steel". Available in a complete range of sizes up to 20" through your favorite supply store.



ASSOCIATION OF WELL HEAD EQUIPMENT MANUFACTURERS CERTIFIED

RECTOR WELL EQUIPMENT COMPANY, Inc.
1100 North Commerce St., Fort Worth, Texas
Houston Plant: 2215 Commerce St.
EXPORT REPRESENTATIVES:
Continental Supply Co., Mid-Continent Supply Co., Oil Well Supply Co.

WICKWIRE *Refined*

DOUBLE GRAY

... extra high strength wire rope gives you increased resistance to

ABRASION
PEENING
CRUSHING

Double Gray* *extra*-improved plow steel rope will give you *extra* service life . . . where abrasion shortens rope life . . . where peening action on rope wires causes them to flatten out and split . . . where crushing against drums, sheaves, or adjacent wraps of rope deforms individual wires, restricting the very necessary minute free rotation of individual wires during rope use.

Double Gray was carefully *refined* over several years, and tested extensively on the largest, most powerful wire rope fatigue-testing machine in operation anywhere, *before* it was released to the field. The resultant harder, stronger steel has given Double Gray *extra* resistance . . . resistance that enables Double Gray to quickly repay its slightly higher initial cost in longer life and increased safety.

**Wickwire Double Gray Wire Rope is made of extra-improved plow steel. Fortified by an independent wire rope core of the same extra high strength steel, Double Gray has a 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.*

Send today for your free copy of our booklet on Double Gray. Write to:
Advertising Department, The Colorado Fuel and Iron Corporation,
575 Madison Avenue, New York 22, N. Y.

8439

LOOK FOR THE YELLOW TRIANGLE

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise Butte • Denver • El Paso • Farmington (N. M.) • Fort Worth • Houston • Kansas City • Lincoln Odessa (Tex.) • Oklahoma City • Phoenix • Pueblo • Salt Lake City • Tulsa • Wichita

PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • San Leandro Seattle • Spokane

WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit Emlenton (Pa.) • New Orleans • New York • Philadelphia

GAS ENGINES DO IT AGAIN!

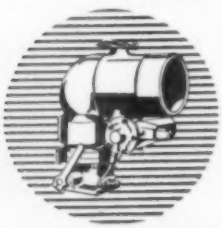
Worlds' Deepest Well

TRIPLE Le Roi V12 L-4000'S with ENSIGN CARBURETION

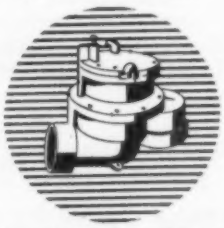
Monstrous power of these triple LeRoi gas engines pushed the Phillips well 1-EE University, Pecos County, Texas, past the 24,000 foot mark, deepest hole in the world.

THIS IS GAS ENGINE POWER. Its unfailing dependability is, of course, taken for granted because good engine designers intended it that way. Likewise, dependable and unfailing as the gas engine carburetion must be, it, too, is taken for granted because carburetor designers at Ensign intended it that way. And so it is today for nearly half a century Ensign carburetion is OEM (original equipment) on practically all leading makes of Gas and LP-Gas power units. Ensign is dependable.

INSIST ON ENSIGN — ACCEPT NOTHING LESS!



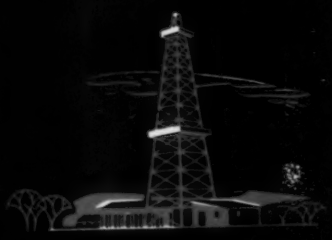
Ensign 3" Model Dg Gas Carburetor



Ensign 2" Model B Fuel Regulator

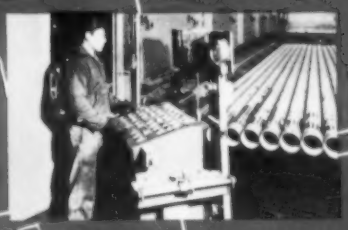
ENSIGN
CARBURETOR COMPANY
1551 E. Orangethorpe, Fullerton, California
Branch Factory: 2330 W. 58th Street, Chicago, Illinois
Dealers and distributors in all principal cities

WHAT DOES IT TAKE TO BE A MAJOR?

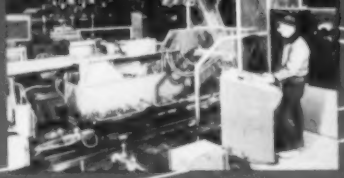


REPUBLIC STEEL IS THE FASTEST GROWING MAJOR IN CASING AND TUBING BECAUSE...

1. **EXPERIENCE**—Republic people know the oil industry as well as they know steel. For half a century, they've been working to improve steels, equipment and manufacturing methods for oil country goods. Their success has made Republic the fastest growing "major" in Casing and Tubing.



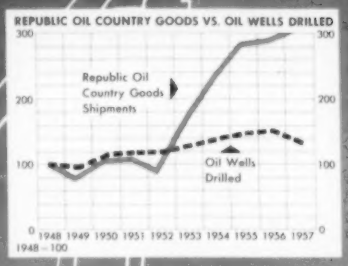
2. **QUALITY**—Republic's reputation for furnishing quality products year-in and year-out has been solidly built by rigid quality control. At Republic's Seamless mill in Chicago, for one example, each joint is subjected to four inspections and five tests. Product quality has helped to make Republic the fastest growing "major" in Casing and Tubing.



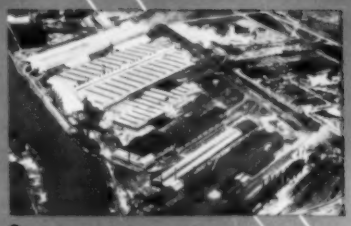
3. UNIFORMITY—Your protection is uniform in every joint of Republic Electric Weld Casing and Tubing. Uniform wall thickness. Uniform roundness and high yield strength. Uniform thickness under the thread roots. Product uniformity has helped make Republic the fastest growing "major" in Casing and Tubing.

4. DEPENDABILITY—[illegible] one-word description of Republic Casing and Tubing. No matter how shallow or deep the well, you can count on the dependability of Republic products throughout every joint in your string. Product dependability has helped make Republic the fastest growing "major" in Casing and Tubing.

5. FACILITIES—Produced in the world's most modern mills, Republic Casing and Tubing are made by skilled craftsmen on the very latest in precision equipment. This combination of facilities and abilities has helped to make Republic the fastest growing "major" in Casing and Tubing.



To meet your needs for oil country tubular goods, Republic has tripled Casing and Tubing production in the last ten years. Seamless and welded. H-40, J-55, N-80. Certified to meet all API requirements. On-schedule delivery from strategically located field stocks. Specify "Republic". For more information, write Dept. OG-6315, 1441 Republic Building, Cleveland 1, Ohio.



6. RESOURCES—Republic is completely integrated—a big advantage in producing quality Casing and Tubing. From ore to finished product, Republic watches over every step of production to insure uniform quality on a mass-production basis. Integration of resources has helped to make Republic the fastest growing "major" in Casing and Tubing.

REPUBLIC STEEL

CLEVELAND, OHIO

REPUBLIC STEEL

REPUBLIC STEEL

IS THE

FASTEST GROWING

MAJOR

IN CASING

AND TUBING

greater power... more economy!

White's Superior HIGH COMPRESSION* GAS ENGINES

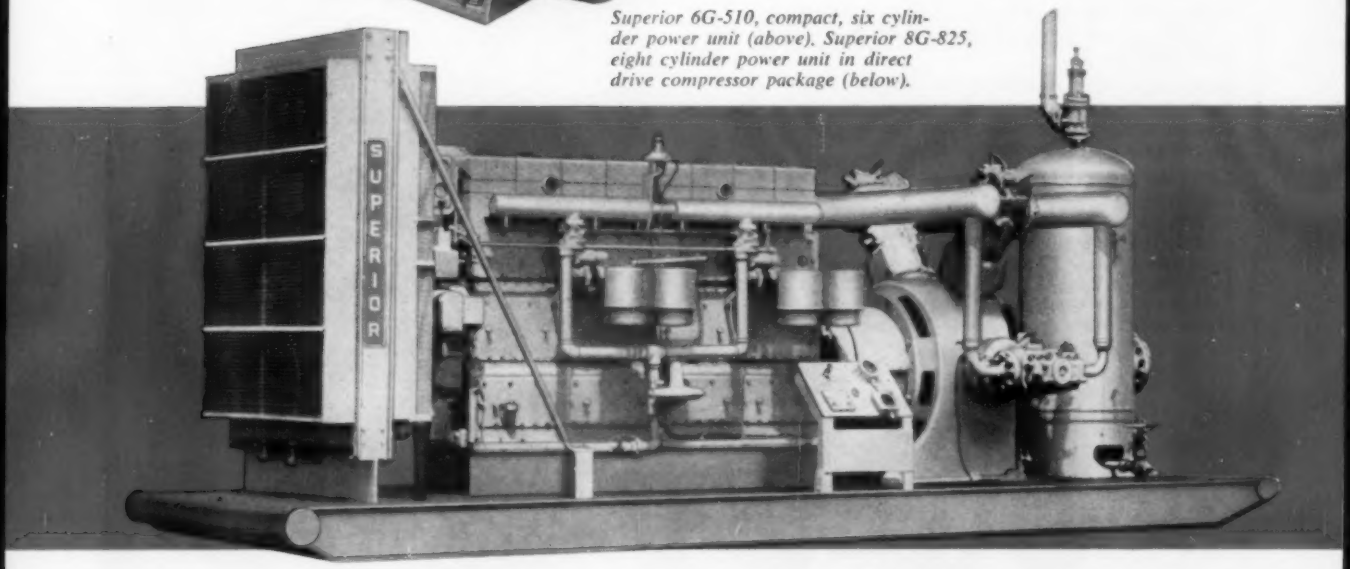
. . . for all oil field jobs . . . compressors, electric generators, drilling, production, pipeline pumping, and repressuring.

White's new developments in the G-510 and G-825 gas engines include new piston crown contours, new cylinder head intake passage contours, and more efficient combustion chamber cooling. These improvements achieve greater fuel-air turbulence, higher compression, more thrust for higher torque, longer valve life, and less fuel consumption . . . resulting in important fuel savings.

Outstanding design simplicity eliminates high mortality parts. Rugged, high-quality construction requires fewer replacement parts . . . maintenance and repair costs are reduced to a minimum over a long engine life of dependable, continuous, heavy-duty service. Get complete information from leading oil field distributors, White oil field representatives, or through White Diesel Engine Division.

**High compression engines designed for natural gas or propane fuel. Standard ratio engines also available.*

Superior 6G-510, compact, six cylinder power unit (above). Superior 8G-825, eight cylinder power unit in direct drive compressor package (below).



horsepower ratings

model	cylinders	rpm	continuous	intermittent	maximum
6G-510	6	1000	330	370	412
6G-825	6	900	465	525	590
8G-825	8	900	625	705	790

White's conservative ratings indicate actual usable horsepower performance of standard stock engines equipped with radiator. No correction necessary to 1500 ft. elevation and 90°F.

Superior ENGINES · ATLAS Imperial DIESEL ENGINES · White DIESEL

White Diesel

WHITE DIESEL ENGINE DIVISION, THE WHITE MOTOR COMPANY, *Plant and General Offices: Springfield, Ohio*

JEFFERSON

GAS-SCRUBBING AGENTS

. . . are ready to roll by tank car or tank wagon from nearby shipping points.

MONOETHANOLAMINE **DIETHYLENE GLYCOL**
DIETHANOLAMINE **TRIETHYLENE GLYCOL**

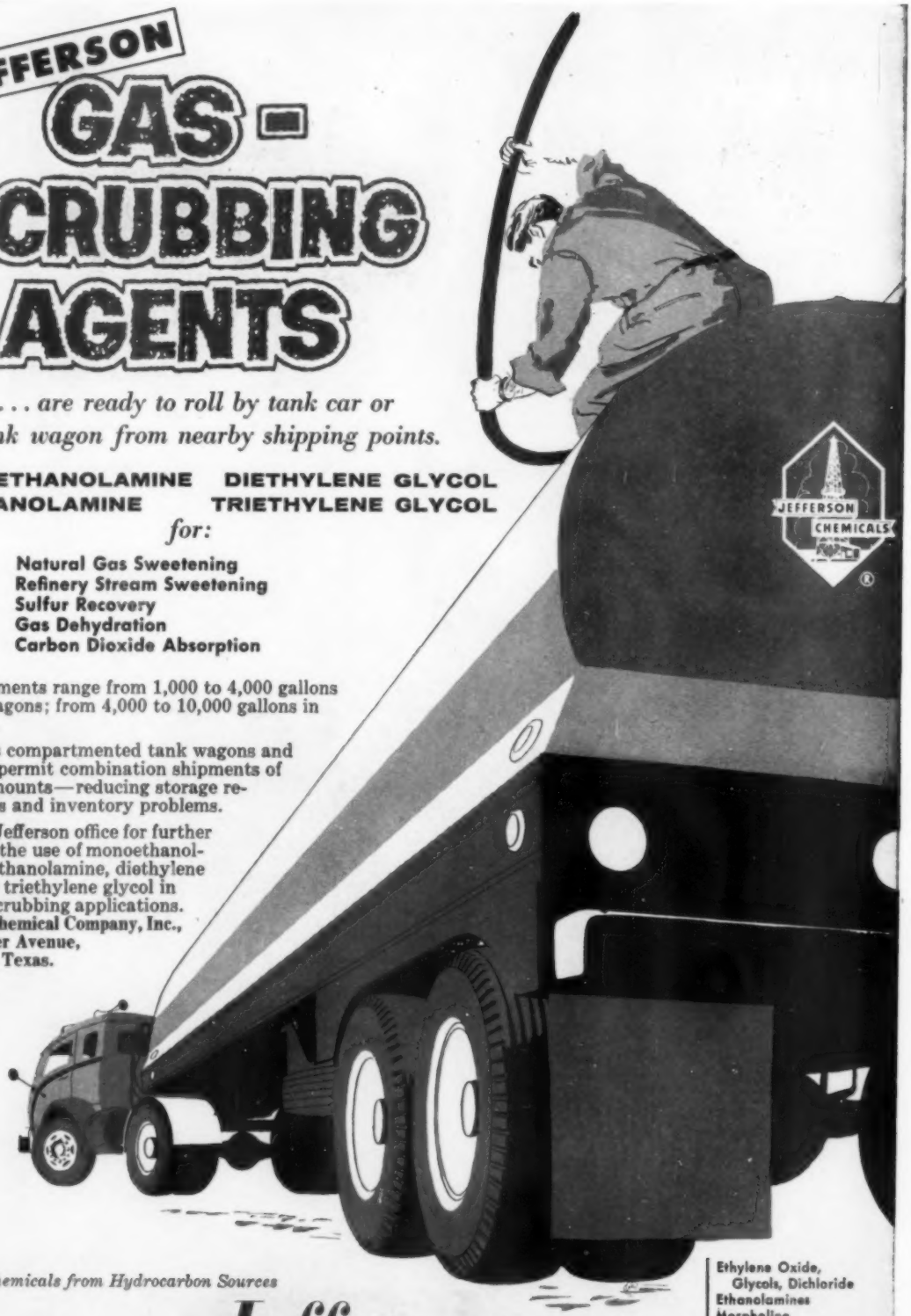
for:

Natural Gas Sweetening
Refinery Stream Sweetening
Sulfur Recovery
Gas Dehydration
Carbon Dioxide Absorption

Bulk shipments range from 1,000 to 4,000 gallons in tank wagons; from 4,000 to 10,000 gallons in tank cars.

Jefferson's compartmented tank wagons and tank cars permit combination shipments of smaller amounts—reducing storage requirements and inventory problems.

Call your Jefferson office for further details on the use of monoethanolamine, diethanolamine, diethylene glycol and triethylene glycol in your gas-scrubbing applications.
Jefferson Chemical Company, Inc.,
1121 Walker Avenue,
Houston 2, Texas.

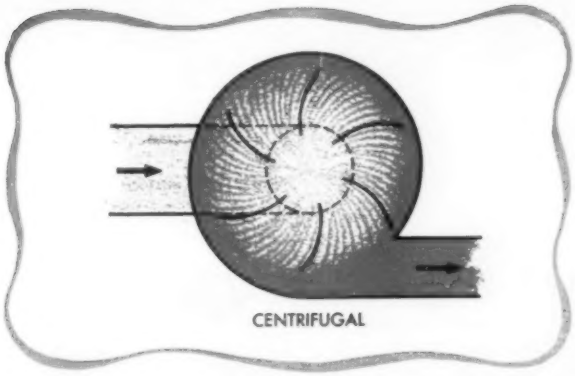


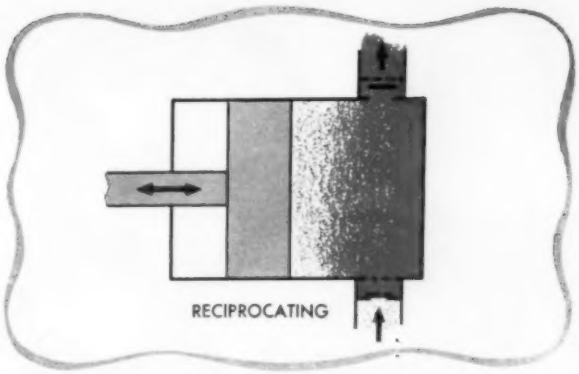
Essential Chemicals from Hydrocarbon Sources

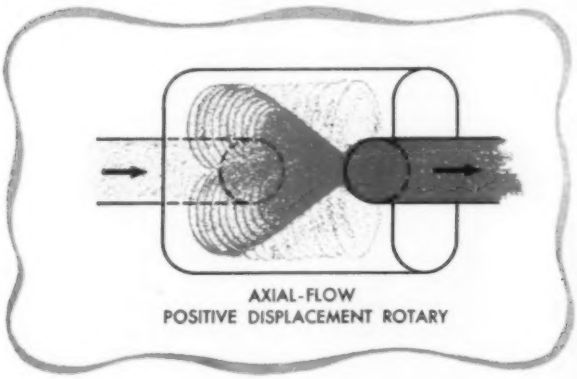
Jefferson
CHEMICAL COMPANY, INC.

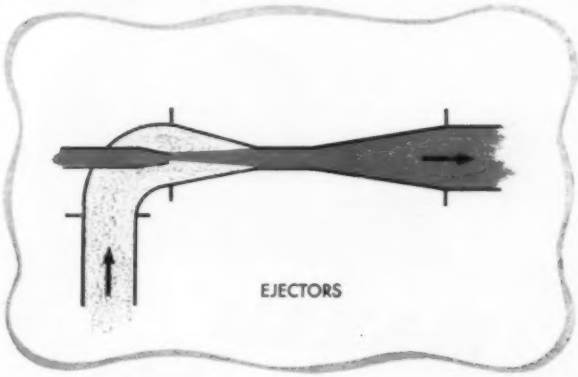
HOUSTON • NEW YORK • CHICAGO • CLEVELAND • CHARLOTTE • LOS ANGELES

Ethylene Oxide,
Glycols, Dichloride
Ethanolamines
Morpholine
Piperazine
Polyethylene Glycols
Nonyl Phenol
Surfonic® Surface-Active
Agents—N Series and
TD Series
Ethylene Carbonate and
Propylene Carbonate







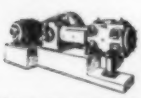


Which method is best for your PRESSURE or VACUUM requirements?

AIR or any other gas behaves differently under each of these methods of compression or evacuation. But for any set of operating conditions, *one method* will have advantages that make it the most practical and economical solution to the problem.

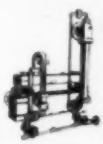
Ingersoll-Rand, the only manufacturer of *all four types* of compressors, is in a unique position to help you select the most efficient unit for any job. Here are a few general comments on each type.

Centrifugal Compressors. Ingersoll-Rand centrifugal blowers and compressors are available in single- and multi-stage units, for handling large volumes of air and all other gases at vacuum and for pressures up to 2500 psi and higher. Sizes range up to 20,000 hp and capacities to 300,000 cfm. They can be driven by steam turbine, electric motor, combustion-gas turbine and hot-gas expander turbine.



Reciprocating Compressors. I-R reciprocating compressors are available in single- and multi-cylinder designs to meet a wide range of high-pressure, low-volume requirements. They have been furnished in sizes from ½ to 7,500 hp, for pressures to 35,000 psi and vacuums. Driver types may be electric, steam, oil or gas, and oil-free air can be provided by means of Type NL non-lubricated cylinders and valves.

Axi-Compressors. The Ingersoll-Rand Axi-Compressor is a compact, space-saving axial-flow positive displacement rotary compressor that offers unique advantages within its operating range. It delivers a steady flow of clean, oil-free air or gas and can be direct driven by electric motors or gasoline engines. Available in capacities from 100 to 12,000 cfm for pressures to 15 psi and vacuums to 15″ hg. Higher vacuums can be produced with water injection or with two stage units.



Ejectors. For many applications, I-R ejectors offer maximum simplicity and economy, as they have no moving parts and require practically no attention or maintenance. They can be supplied for vacuums to 5 microns (0.000197″ hg abs), as well as for pressures to 150 psig.

• • •

Your Ingersoll-Rand representative will be glad to give you complete information on any of these compressor or vacuum units — and help you select the one that's best suited to your particular requirements.

Ingersoll-Rand

14-867 11 Broadway, New York 4, N. Y.

There's no substitute for experience in engineered products

MARSH
Christmas Tree
GAUGE
...it stands alone-
In this latest development we reaffirm our pledge to make a better gauge ever better. Only in the Marsh Christmas Tree Gauge you have:
—A better tube construction— bourdon tube and socket fused into a one piece permanently leak-proof unit by the exclusive Marsh "Conoweld" process.
—A better movement— all but frictionless as a result of the self-lubricating effect of unlike metals. Coined sector gear gives greater strength where greater strength is needed; also smoother operation.
—A better case— a copper-clad wrought steel case of boiler plate thickness, produced by the "Marsh-alloy" process. It has the strength of steel, the corrosion resistance of copper, and is one-third lighter than conventional cast-iron cases. The case is finished in corrosion-resistant satin black enamel.
—the Marsh "Recalibrator"— not only the handiest way to keep a gauge accurate; also the best way.
★ There is a Marsh Gauge for every oil country and refinery application. Ask your supply house or write for latest bulletins.
MARSH INSTRUMENT CO.
Sales affiliate of Jas. P. Marsh Corporation
DEPT. L, SKOKIE, ILL.
Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas
Marsh Instrument & Valve Co. (Can.) Ltd.
8407 103rd Street, Edmonton, Alberta, Canada
MARSH
STOCKED by Your Local Supply Store
GAUGES

Photo taken at Delaware Refinery, Tidewater Oil Company

They feed the big cats

Feeding the big catalytic crackers takes close coordination of refining and chemical technology. Leading refiners and Cyanamid chemists worked together to pioneer the development of synthetic cracking catalysts, the first fully regenerative platinum reforming catalyst, the first high alumina catalyst.

Behind Cyanamid's service as a major catalyst producer are its unlimited resources as a major chemical producer.

Cyanamid's man with the golden rule can bring further progress through unique catalytic and chemical research and development facilities.

Basic in Catalyst Chemistry

CYANAMID

AMERICAN CYANAMID COMPANY • REFINERY CHEMICALS DEPARTMENT • 30 Rockefeller Plaza, New York 20, N. Y.

Originators of AEROCAT® Fluid Cracking Catalysts, AEROCAT TRIPLE A® High Alumina Catalysts, AEROFORM® Fluid Hydroforming and Platinum Reforming Catalysts, AERO® HDS Catalysts, AERO® Specialty Catalysts, CYPAN® Drilling Mud Conditioner, AEROLUBE® Lubricating Oil Additives, AERONOX® Antioxidants, AEROSOL® Surface Active Agents.

Mr. Lewis Parley who operates a Sherman Power Digger for the Hood Construction Co. of Los Angeles, Calif. says, "I have been a backhoe operator for six years and in that time have run several different makes, but I have never run one as good as the "F" Sherman."

If You Excavate... What These Men Say About Sherman Diggers Is Important

When it comes right down to it, the men who own and operate power diggers day after day are the ones who really know how such units perform and how they stand up.

That's why the comments of these typical Sherman Power Digger operators are important to every excavator. They prove the Sherman saves you money for two reasons: First, the Sherman digs faster, completes jobs quicker. Second, the Sherman is so rugged and dependable that downtime is kept at a minimum.

Prove to yourself the Sherman is your best buy—"Clock it" on your own job—without obligation. At the same time, check the many exclusive features that *keep the Sherman out of the repair shop and "on the job."*

Write today for Bulletin No. 1576.

Mr. E. L. Shaner handles an "F" Sherman Power Digger for contractor E. A. Irish at a new subdivision in Laguna Beach, Calif. He says, "I have run them all and I like the Sherman best. It is easier handling. For instance, if I am sitting on a bank, I can swing up-hill—something you can't do with some of the other rigs. They just won't do it. And the Sherman has a full 90 degree swing both ways."

Sherman Products

SHERMAN PRODUCTS, INC., Royal Oak, Michigan

POWER DIGGERS • LOADERS • FORK LIFTS

SOIL WORKING TOOLS • CRANES AND EXCAVATORS

In Seattle, Mr. Sam English, one of the owners of Excavators, Inc., reports a saving in money on a utility contract because the Sherman undercuts eight feet unbroken sections of pavement, thus eliminating expensive handwork. He says, "The maneuverability, efficiency and economy of the Sherman make it the best digger I have seen."

Mr. L. L. Donaghue and Mr. Vernon O. Lippoldt, co-owners of the D & L Ditching Service of Haysville, Kansas, say, "The Model "F" is our fifth Sherman digger and if we were going to buy a digger tomorrow, it would be one just like this one. We already have 275 hours on it and have yet to tighten a bolt."

Which Unibolt stem seat has been in corrosive gas-distillate service for 8 years?

UNIBOLT Christmas tree fittings — tees, crosses, positive chokes, adjustable wing valves — trimmed in exclusive UNIBOLT "SA" Stainless, or made entirely of this special analysis alloy, are winning the fight against corrosive fluids and gases.

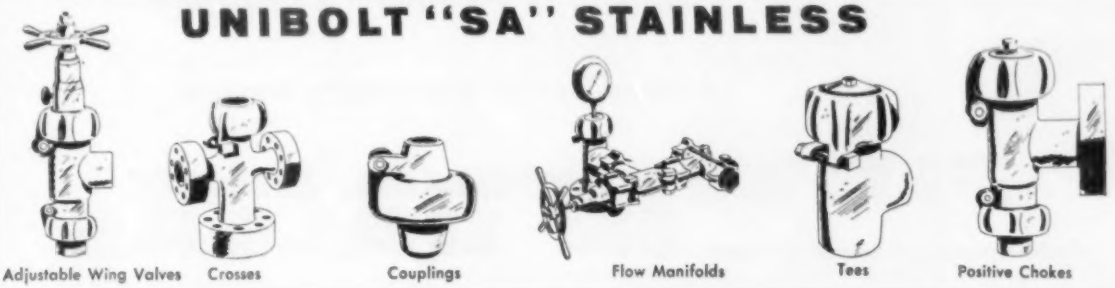
Production containing either hydrogen sulphide or carbon dioxide, or both, usually attacks and quickly destroys carbon steel and some alloy steel parts.

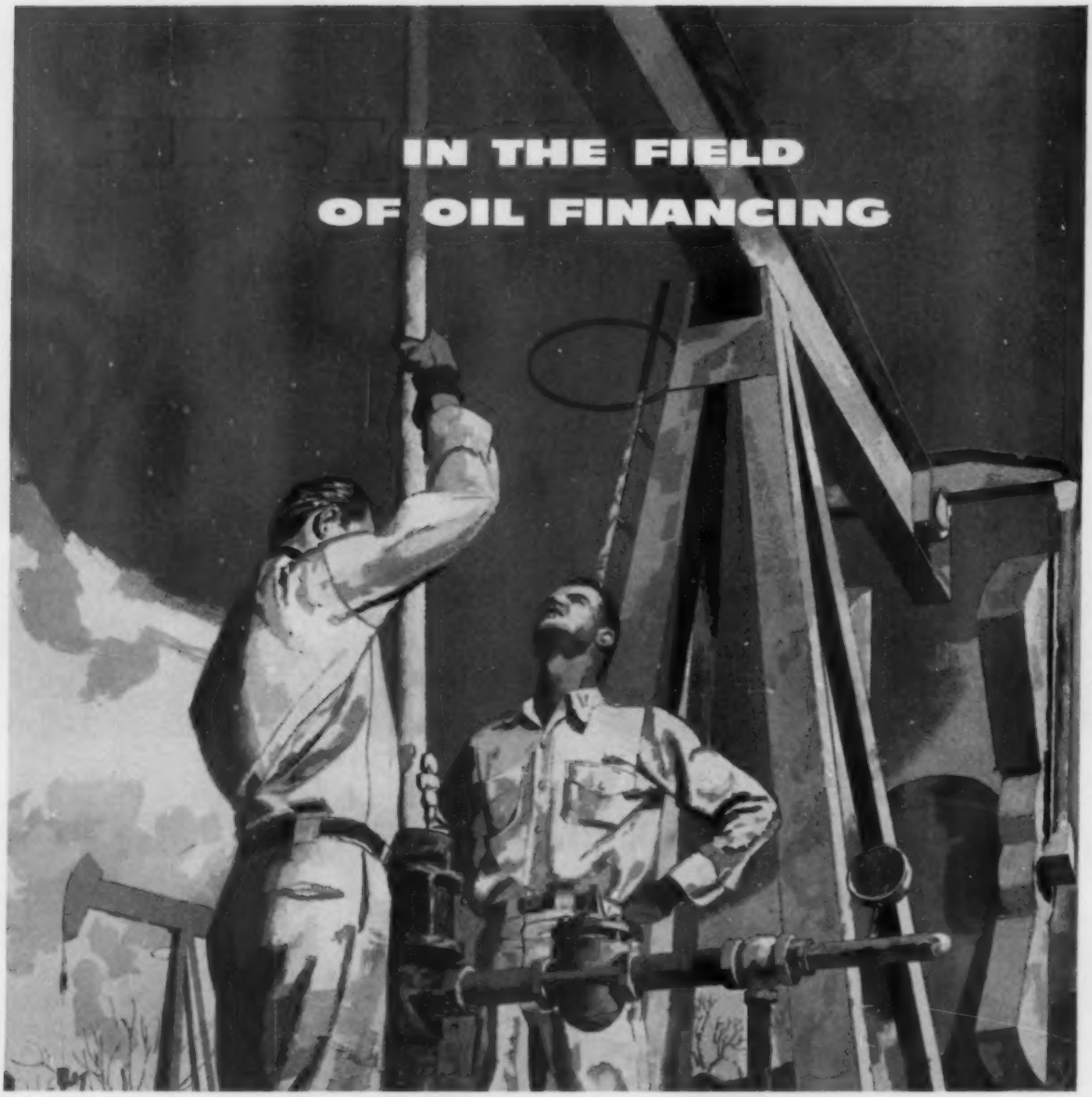
A standard UNIBOLT Adjustable Wing Valve, installed on a corrosive well in the Katy Field (Texas Gulf Coast) required replacement of the carbon steel seat in only 45 days. A UNIBOLT "SA" Stainless Valve installed at that time has shown no corrosion damage in eight years. As the above photograph reveals, the 8-year-old stem seat (right) still shows no sign of corrosion, for all practical purposes is as good as the new stem seat (left).

Got any corrosive wells? A UNIBOLT representative will gladly give you full particulars and case histories on "SA" (Special Analysis) Stainless.

THORNHILL CRAVER CO.
P. O. BOX 1184 HOUSTON, TEXAS

UNIBOLT "SA" STAINLESS





Let your plans include the specialized knowledge and resources of the nation's Pioneer Oil Bank.

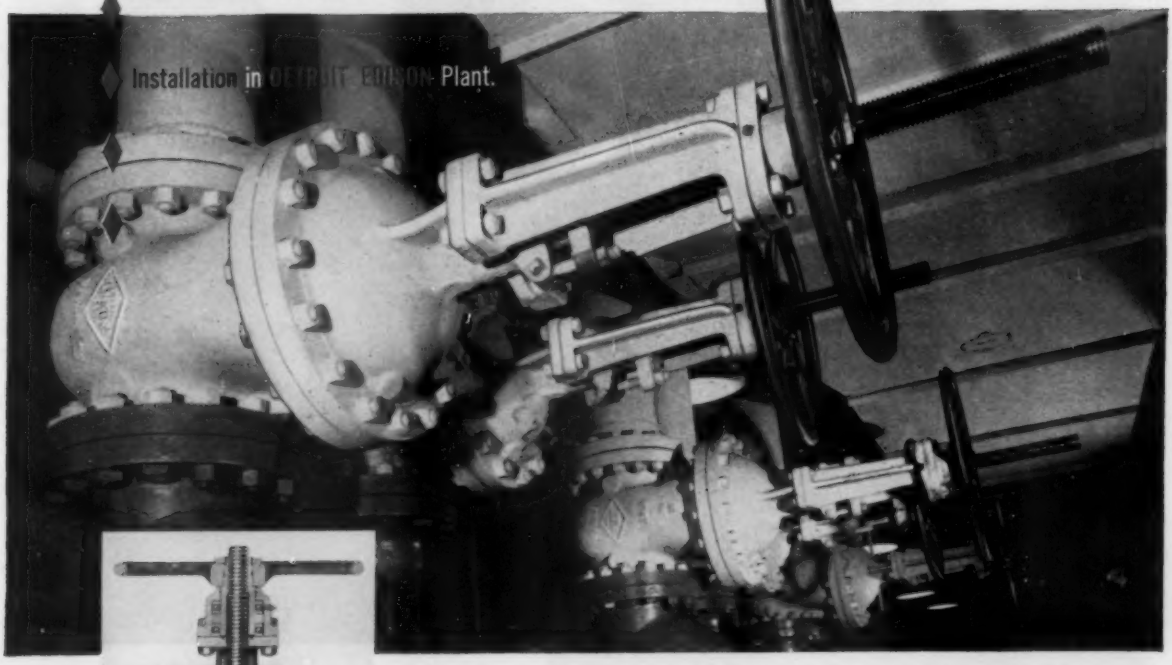
83rd Year of Dependable Service

FIRST NATIONAL BANK IN DALLAS

Member Federal Deposit Insurance Corporation

where they really know Costs

—you'll likely see the famous Jenkins mark on CAST STEEL Valves



Installation in DETROIT EDISON Plant.

Fig. 1046 600 lb. O.S. & Y. Globe

In the power generation and industrial processing plants where Cast Steel valves are numbered by the score . . . where replacement and maintenance costs are recorded to the last penny . . . the true economy of Jenkins Valves is clearly seen.

Records will always show the extra value which Jenkins builds into Cast Steel valves, not only with design features you can see but also with unbending quality standards for alloys, castings, machining. Plus the toughest known testing and inspection system to assure perfection in every detail, and safety factors far beyond ratings.

Select from the Big Line in this Catalog. It includes pressure castings of Carbon, Carbon-Moly, 1¼% Chromium-Moly, 4% — 6% Chromium-Moly, 3½% Nickel . . . alloys that meet a wide variety of specifications. Also, a wide choice of patterns, sizes and seating material combinations to satisfy your different service conditions.

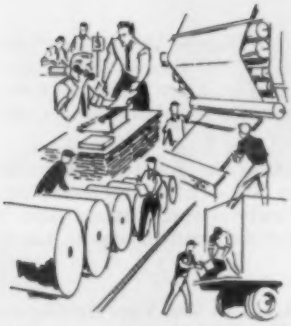
CALL YOUR JENKINS DISTRIBUTOR for a copy of Jenkins Cast Steel Valve Catalog and prices. Or write to Jenkins Bros., 100 Park Ave., New York 17.

Typical Jenkins features deliver lasting economy

A ball bearing yoke sleeve is standard on larger sizes • Cooling chamber and plugged connection for test purposes is regularly provided below packing box, but a lantern gland stuffing box is optional • Rustproof, lubricated and graphited, wire reinforced packing is standard • Soft steel ring joint body-bonnet gasket, fitted into accurately matched grooves to assure a vapor-tight joint • Seating is regrind-renew type.

JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
JENKINS SINCE 1864
Jenkins Bros.

Sold Through Leading Distributors Everywhere



Literally everyone connected with a newspaper goes unseen except the newsboy who sells it. Editors, reporters, copy boys, makeup men, engravers, typesetters—this is but a fraction of the hidden army that brings you the news.

there's more to Cities Service than meets the eye!

A newspaper is much more than a few ounces of paper and a bit of printer's ink. It is the end product of acres of forests converted into newsprint, of world-wide news and photo organizations, diligent local staffs, skilled editors and typographers, block-long high-speed presses, and fleets of vehicles to rush the printed paper to readers while the news is "hot."

There is much more, also, to a gallon of gasolene than a chemical analysis would show. The motor fuel supplied at Cities Service stations is the end product of a job which reaches out to four continents. All this required a capital investment from Cities Service of more than $179,000,000 in 1957 alone.

Only in this way can the petroleum needs of the public be met—and petroleum, next to food, is the most vital product in America today.

CITIES SERVICE

big & better

BETTER BECAUSE:

- 16,000 pound weight insures free non-wobbling falls, under multiple sheave string-up with large diameter drilling lines.
- Heavy divider plates between each sheave, more evenly distribute heaviest loadings and eliminates center pin deflection.
- Johns-Mansville "Klipper" grease seals positively retain lubricant, exclude all foreign matter from bearing cavity.
- 50" O. D. Alloy steel flame hardened sheaves grooved to proper line SIZE—Double row pre-adjusted Timken bearings, mounted on 10½" diameter alloy steel shaft.
- E-Z opening guards for quick stringing up. No bolts to pull out and lose.

Write for complete McKissick catalog.

McKISSICK PRODUCTS CORPORATION
Box 2496 Tulsa, Oklahoma

McKISSICK

2 BIG REASONS WHY MAJOR PIPELINES

1 LOW MAINTENANCE. Bingham Pipeline Pumps are of "Double Volute" design, insuring perfect hydraulic radial balance of rotating element. "Hydraulic Radial Balance" eliminates unequal pressures on the rotating element—**"Side Push"**—which is the primary cause of wear and maintenance in conventional pumps. Also this feature, which eliminates shaft deflection, permits **mechanical seals** to establish and maintain uniform track between the contacting faces. This prevents leakage and seal face wear, resulting in *long seal life.*

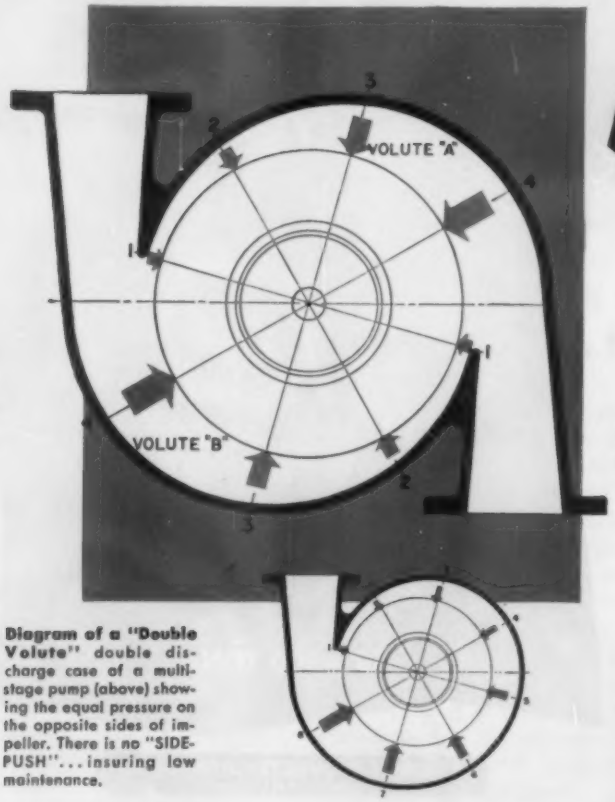
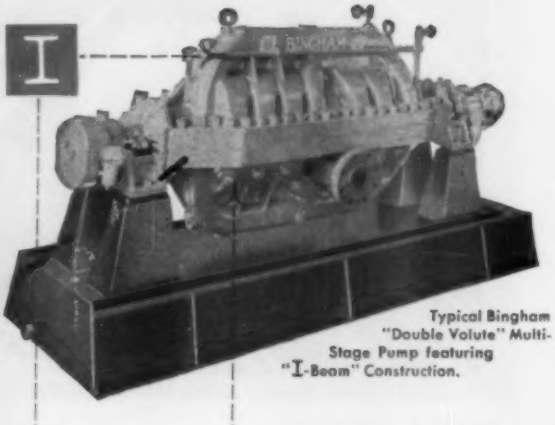


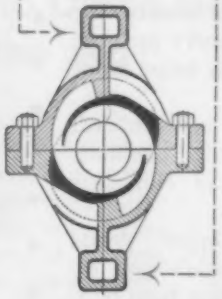
Diagram of a "Double Volute" double discharge case of a multi-stage pump (above) showing the equal pressure on the opposite sides of impeller. There is no "SIDE-PUSH"... insuring low maintenance.

Diagram of "Single Volute" pump case (immediately above) showing unequal pressures at opposite points around the periphery of the impeller. These unequal pressures cause "SIDE-PUSH" on the rotating elements, causing wear of rotating parts and, frequently, high maintenance.

2 ASSURED CASE STRENGTH FOR HIGH-PRESSURE SERVICE



Typical Bingham "Double Volute" Multi-Stage Pump featuring "I-Beam" Construction.



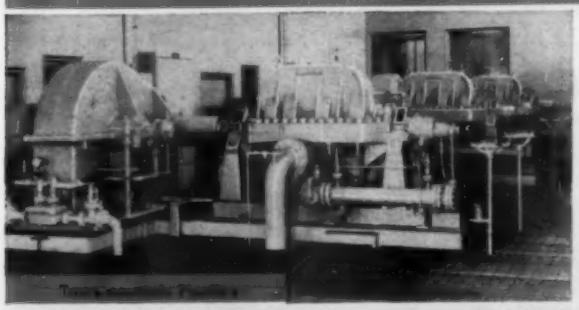
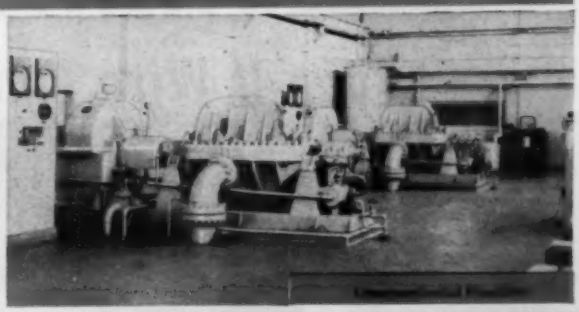
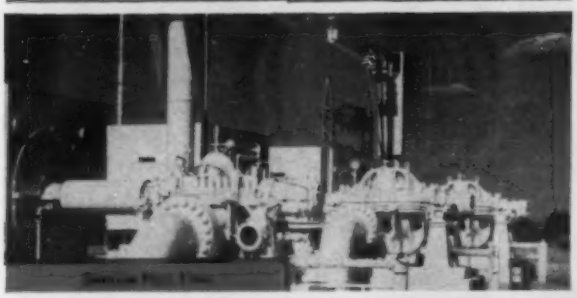
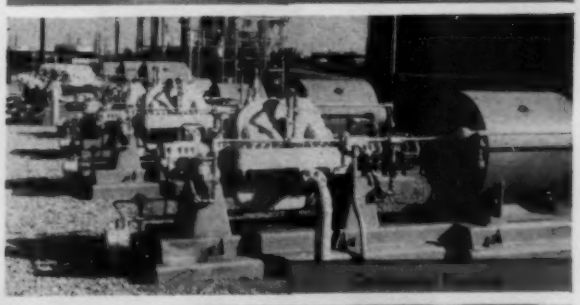
A transverse cross-section of Bingham "Double Volute" Multi-Stage Pumps, showing identical cross-overs cast integrally with the upper and lower halves of the pump casing.

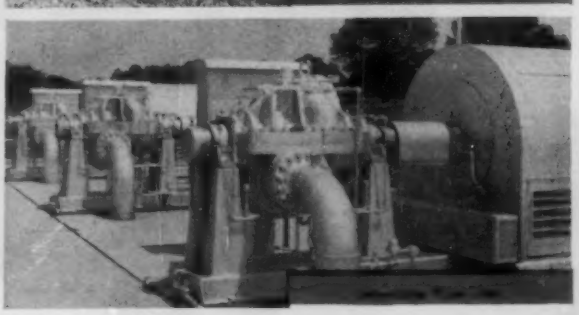
Integral cross-overs in Bingham "Double Volute" multi-stage pumps produce casings of maximum strength for high pressure service because each cross-over is cast integrally with its half of the pump casing, and thereby becomes a structural member of Bingham's "I-Beam Truss Construction".

This feature, found only in Bingham pumps, increases the strength of the pump casing to such an extent that it can safely withstand operating pressures up to 2000 psi with standard construction (higher pressures with special construction).

Bingham "Double Volute" Multi-Stage Pumps will best serve your pipeline operations, as they are now serving major pipelines. Write to your nearest Bingham office for "Double Volute" Bulletin or additional information.

SELECT *Bingham*
. . . "DOUBLE VOLUTE" PUMPS



PARTIAL LIST OF MAJOR PIPELINES WITH BINGHAM "DOUBLE VOLUTE" PUMPS IN OPERATION OR ON ORDER

Ashland Oil Pipe Line
Buckeye Pipeline
Badger Pipeline
Cities Service Pipeline
Continental Pipeline
Esso Standard Oil Pipeline
Getty Oil Company
El Paso Natural Gas Prod. Co.
Everglades Pipe Line Co.
Great Lakes Pipeline
Interprovincial Pipeline
Interstate Pipeline
Lakehead Pipeline
Magnolia Pipeline
Minnesota Pipeline
Ohio Oil Company
Okla.-Miss. River Pipeline
Pasotex Pipeline
Pembina Pipeline
Phillips Pipeline
Plantation Pipeline
Rocky Mountain Pipeline
Salt Lake Pipeline
Shamrock Oil Company
Service Pipeline
Shell Pipeline
Sinclair Pipeline
Sohio Pipeline
Southern Pacific Pipeline
Standard Oil of Ind. Pipeline
Sun Pipeline
Texas Company
Tidewater Assoc. Pipeline
Trans-Mountain Pipeline
Trans-Northern Pipeline
Tuscarora Pipe Line
Union Oil Pipeline
Westpur Pipeline Company

Bingham
SINCE 1921

DOUBLE VOLUTE PUMPS RADIAL BALANCE

BINGHAM PUMP COMPANY
General Offices: 2800 N.W. Front Avenue, Portland 10, Oregon
Factories: Portland, Ore. • Vancouver, B. C., Canada

SALES AND SERVICE OFFICES

BOSTON, MASS.
CHICAGO, ILL.
CLEVELAND, OHIO
DALLAS, TEXAS
DENVER, COLO.
HOUSTON, TEXAS
KANSAS CITY, MO.
LOS ANGELES, CALIF.
NEW ORLEANS, LA.
NEW YORK CITY, N.Y.
PHILADELPHIA, PA.
PITTSBURGH, PA.
SAN FRANCISCO, CALIF.
SEATTLE, WASH.
ST. LOUIS, MO.
ST. PAUL, MINN.
TULSA, OKLA.
TORONTO, ONT., CAN.
VANCOUVER, B. C., CAN.

LONG TIME BETWEEN CHANGES!

When You START *Using Guiberson's*

Type U Wire Line Oil Saver

Workover crews tell us they keep fewer spare rubbers on the rig for this saver — they need changing so seldom.

Swabbing operations go along a lot smoother with less trouble and less expense. Three durable special alloy bronze *rollers* center the wire line perfectly through the saver. And the rubbers in this saver are the same large, long-wearing rubbers used in Guiberson's Type S oil saver — they won't extrude or stick in the housing. Split-type housing, joined by two husky bolts, makes installation or removal quick and easy.

Use the Type U singly, or in tandem leaving off the roller cap on the lower saver. When you do need them, get Guiberson replacement rubbers packed two pair to a blue and yellow box.

Get the Best — Get Guiberson.

Available in 2" or 2½" EUE 8 round double pin sizes and 3" 8V line pipe or 3" EUE 8 round double pin sizes for ⅜"-⅜", ½"-½" or ¾"-1" wire line.

THE
GUIBERSON
CORPORATION
ESTABLISHED 1919
DALLAS, TEXAS
U. S. A.
Sold by
Oil Field Supply Stores
Everywhere

This tubing goes to any depths for oil

TO meet the current trend to deeper wells and higher pressures, the Timken Company developed a high-strength oil well tubing of exceptional uniformity and ductility.

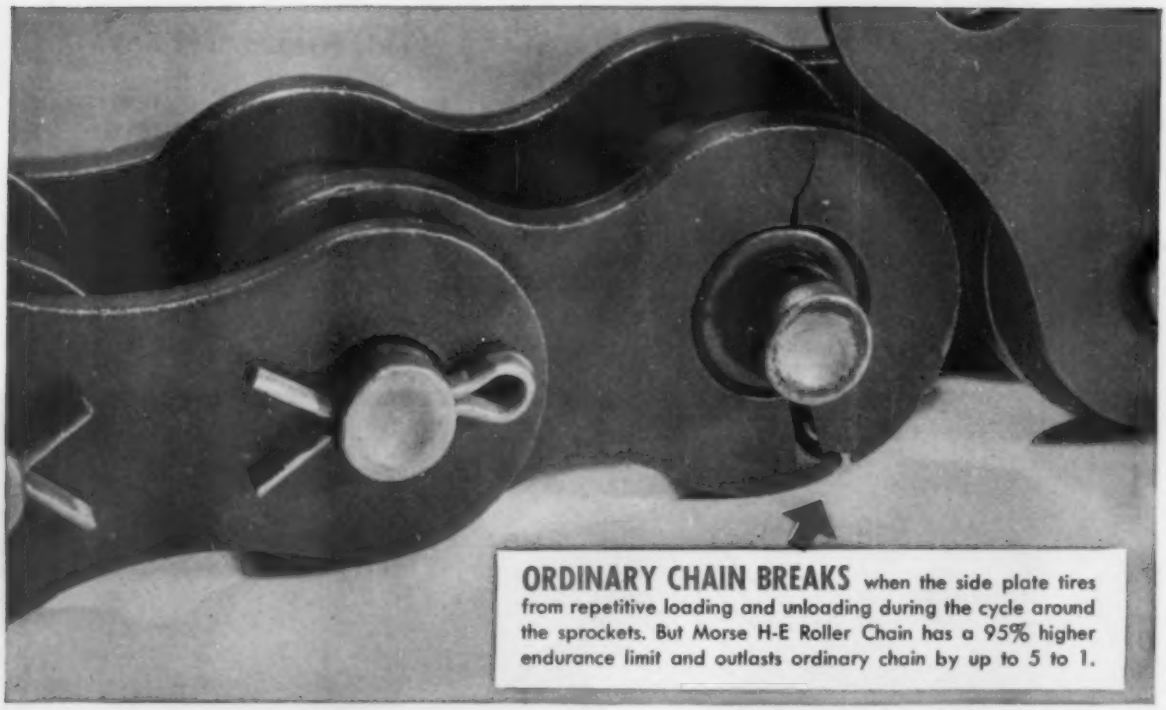
This tubing offers a yield strength up to 125,000 PSI. It's 20% stronger than required by the stiffest API specification—5A. It can take internal pressures up to 15,000 PSI. Actually, the well hasn't yet been drilled that can produce all the pressure Timken® seamless steel tubing can take.

Whatever your specific oil or gas well tubing problem, Timken seamless steel tubing provides a ready solution. For 24 years we have been making high pressure seamless tubing for special requirements, in a wide variety of sizes and analyses. Send for free engineering study, "Timken Oil And Gas Well Tubing", a study of various alloys for high strength and corrosion resistance. Write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* **STEEL**

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



ORDINARY CHAIN BREAKS when the side plate tires from repetitive loading and unloading during the cycle around the sprockets. But Morse H-E Roller Chain has a 95% higher endurance limit and outlasts ordinary chain by up to 5 to 1.

"Tired Metal"... the bane of chain now licked by MORSE H-E

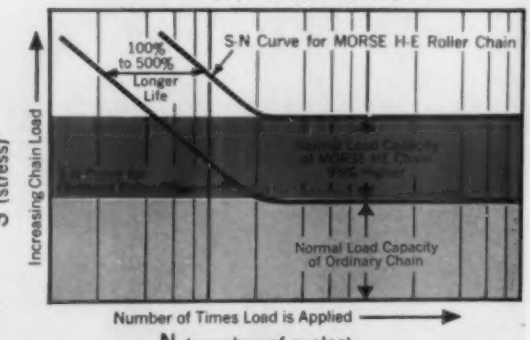
Morse H-E Roller Chain outlasts ordinary chain by up to 5 to 1 . . . can save you thousands of dollars annually on tough drilling jobs

Deep drilling puts chain under terrific loads and shocks until metal "tires," and ordinary chain breaks. But a special process gives Morse H-E Roller Chain 95% higher endurance limit . . . up to 500% longer service life.

This special process means Morse H-E Chain costs up to 10% more. Yet that's a small price to pay for heavy-duty oil-rig chain that can save you thousands of dollars yearly in replacement costs and downtime.

For more information on the chain that licked the "tired metal" problem, check your favorite supply store. Or write: MORSE CHAIN COMPANY, Dept. 22-118, Ithaca, New York. Warehouses in Casper, Wyoming; Houston and Odessa, Texas; Farmington and Hobbs, New Mexico. Export: Borg-Warner International, Chicago 3, Illinois.

Chain Life: Morse High Endurance vs. Ordinary Roller Chain


100% to 500% Longer Life
S-N Curve for MORSE H-E Roller Chain
Normal Load Capacity of MORSE H-E Chain
Normal Load Capacity of Ordinary Chain
S (stress)
Increasing Chain Load
Number of Times Load is Applied
N (number of cycles)

Red area: Under these chain loads, fatigue will break ordinary chain . . . but not Morse H-E.

White area: Under these loads, fatigue will break ordinary chain and Morse H-E . . . but Morse H-E will have operated 100% to 500% longer.

IN POWER TRANSMISSION THE TOUGH JOBS COME TO

MORSE

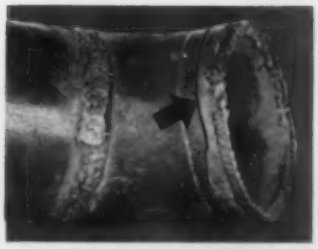
MORSE B-W

*Trademark

Watch out for the risks of

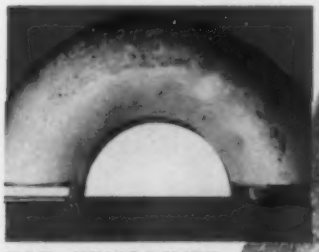
QUESTION MARK FITTINGS!

- *WASTED DOLLARS*
- *PRODUCTION SHUTDOWNS*
- *HAZARDS TO LIFE*
- *DAMAGE TO YOUR REPUTATION*



SUB-STANDARD THICKNESS

This Question Mark elbow cracked after welding. Minimum wall thickness was 24.9% less than nominal, compared to 12.5% permitted by ASA B16.9 code. Also, material was low in silicon.



NON-UNIFORMITY

Often, Question Mark fittings are out of round, or not uniform in center-to-face or face-to-face angle. Radius of this 180° return is not uniform.

SUB-STANDARD DUCTILITY

Question Mark 45° elbows of this assembly cracked clear through in four places after welding due to improper manufacture, resulting in ductility of about 50% of ASTM standards.

PATCHED DEFECTS

Imperfections such as the welded-in area of this Question Mark tee are often hidden by paint. They can be source of failure.

IMITATING TAGS

Some Question Mark fittings use welded-on identification tags like this—an oval shape to imitate the world-famous tag of TUBE-TURN products. It gives only size and schedule.

A message in the interests of top-quality piping . . . by Tube Turns, Louisville, Kentucky

TUBE-TURN *Welding Fittings are completely identified. Information given: Manufacturer's identification, size and wall thickness, material or type number, schedule number or weight, laboratory control number.*

specify and buy top-quality

TUBE-TURN® PRODUCTS

AVAILABLE NEARBY. Your Tube Turns' Distributor gives you prompt delivery from a complete line of more than 12,000 stocked items of TUBE-TURN products. Photo courtesy Central Rubber & Supply Co., Inc., Indianapolis.

"Cheap" Question Mark fittings can be mighty costly in the long run. It pays to safeguard your piping investment, *and your reputation,* by insisting on *known* fittings.

When you specify and buy TUBE-TURN* Fittings and Flanges, you know you are getting unsurpassed quality. They meet all American Standard and Safety Code requirements and are fully and permanently identified for your protection.

The trademarks "TUBE-TURN" and "tt" are applicable only to the quality products of Tube Turns.

*"TUBE-TURN" and "tt" Reg. U. S. Pat. Off.

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

Louisville 1, Kentucky

DISTRICT OFFICES: Atlanta • Chicago • Dallas • Denver • Detroit • Houston
Kansas City • Los Angeles • Midland • New Orleans • New York • Philadelphia
Pittsburgh • San Francisco • Seattle • Tulsa
IN CANADA: Tube Turns of Canada Limited, Ridgetown, Ontario
DISTRICT OFFICES: Edmonton • Montreal • Toronto • Vancouver

CHEMETRON

WORLD'S RECORD MILLING JOB!

Servco Pilot Mills chew up 1138′ of 9-5/8″, 53-50 casing at an average milling rate of *4′ per hour!*

Servco Pilot Mills were put to work milling stuck casing after cut-and-pull operations had been tried with poor results. The complete milling job involved 907′ of 9⅝″, 53-50#, N-80 casing, 231′ of 9⅝″, 53-50#, P-110 casing, 7 centralizers and 1 float collar. In all, more than 61,000 pounds of shavings were produced.

These astonishing results were possible because of the use of Servcoloy*—a new, patented hard-facing material that has completely changed thinking about downhole milling. Servcoloy suspends hundreds of carbide chunks in a tough, elastic matrix which acts as a shock absorber—overcoming carbide's inherent sensitivity to shock and permitting its superior cutting quality to be utilized fully. As cutting edges are dulled or torn from the matrix, new edges are automatically exposed. Hundreds of fresh cutting edges are continuously at work, enabling remedial work which formerly took days to do to be done in hours.

Why not put these proven tools to work on your next milling job? Your nearest Servco office will give you complete details.

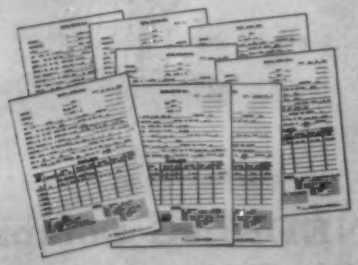
*PATENT NO. 2,833,638

CAN YOUR PRESENT MILLING METHOD MATCH THESE SERVCOLOY RESULTS?

Csg. Wt. & Grade	Total Footage Milled	Milling Hrs.	Time Min.	Ave. Footage Milled Per Hr.	No. Mills Req'd.	Depths
7⅝" 33.70# N-80	110.5*	53	05	2.1	4	Below 12,500′
7⅝" 29.70# N-80	103**	28	07	3.6	2	Below 13,000′
7" 26# N-80	82	14	40	5.8	2	Below 10,000′
7" 26# N-80	202***	18	48	10.6	2	Below 14,000′

*Includes milling bottom half of safety joint and cross over bushing.
**22° angle directional hole.
***Includes milling rotary shoe.

Actual job records and other information will be sent upon request.



SERVCO

General Offices: 2440 Cerritos Avenue, Long Beach 6, California

Mid-Continent and Gulf Coast: 4850 Gasmer St., Houston 35, Texas
Export Agent: International Tool and Supply Co.
45 Rockefeller Plaza, New York 20, New York
Field Offices: Ventura, Bakersfield, Lafayette, Harvey, Oklahoma City
Canada: 5710—103A Street, Edmonton, Alberta
Venezuela: c/o A-Z Export Co., Maracaibo

©THE SERVCO COMPANY

ARE YOU GETTING YOUR SHARE OF THE HIGH OCTANE MARKET?

The consumption of Alkylate is growing for both government and civilian use, and this demand is expected to continue, at least into the middle 1960s. To get your share of the high octane market, consider adding an Alkylation Unit to your facilities as soon as possible.

The Oil and Gas Journal says, "Of the five typical high-quality blends which go into premium gasoline, alkylate is by far the best performer . . . more and more refiners are being pushed to include alkylate in their motor fuels. Heavy competition . . . is responsible for the new emphasis on alkylation."

WHY ALKYLATE IS THE KEY TO CURRENT GASOLINE BLENDS . . .

	Research octane (RON)	Motor octane (MON)	Sensitivity (RON minus MON)	Road octane (Union town)
Alkylate	103.0	104.5	−1.5	107.5
Reformate extract	103.7	94.0	9.7	103.5
C_5 plus reformate	103.0	93.5	9.5	102.5
C_7 plus reformate	100.0	91.7	8.3	100.0
Catalytic cracked	99.0	87.5	11.5	98.0

Reprinted courtesy The Oil and Gas Journal (Aug. 4, 1958)

OVER 50% OF ALL POST-WAR HF ALKYLATION UNITS OPERATING IN NORTH AMERICA WERE DESIGNED, ENGINEERED AND BUILT BY TRECO*

The Refinery Engineering Company has designed, engineered and constructed more HF alkylation units than all other companies combined.

THE TRECO LIST INCLUDES:

Shell Oil Company of Canada	1500 BPSD
NCRA	1522 BPSD
Cosden Petroleum Company	2068 BPSD
DX-Sunray (Tulsa)	2470 BPSD
DX-Sunray (Duncan)	3500 BPSD
CRA	1106 BPSD
Anderson-Prichard Oil Corp.	2150 BPSD
Bell Oil & Gas Company	1000 BPSD
The Carter Oil Company	2300 BPSD

Treco, with an outstanding record of fast refinery completion, can have your alkylation unit on stream QUICK. A telegram, telephone call or letter will bring complete information.

*to September 30, 1958

....talk with the TRECO man.....

TRECO

A DIVISION of VITRO CORPORATION of AMERICA

The REFINERY ENGINEERING Company

FARMINGTON NEW YORK TULSA TORONTO

ATLANTIC CATFORMING is solving refinery puzzles around the world!

Atlantic's Catforming process is being profitably used in these countries that circle the globe. Naturally, there are important reasons that explain this success. Here they are:

1 **CATALYSTS** Designed for your specific problems.

2 **SELECTIVITY** Achieve superior yields at high octanes.

3 **STABILITY** High activity with long life.

4 **DURABILITY** Tolerance for moisture and nitrogen.

5 **REGENERATION** Extends normal life several times.

For further information on how your plant can use Atlantic Catforming techniques, write or wire The Atlantic Refining Company, P.O. Box 8138, Philadelphia 1, Pennsylvania.

ATLANTIC

it's the CATALYST that counts

NEW American®
GASCLOK Power Drive
constant high power • uniquely accurate

Actual Size

American's new **GASCLOK** is a completely self-contained air or gas powered instrument drive and timing unit. Supplying a constant power output of over 20 times the torque delivered by conventional spring-wound clock mechanisms, it is ideally suited as either original or replacement equipment where continuous power and accurate timing are essential.

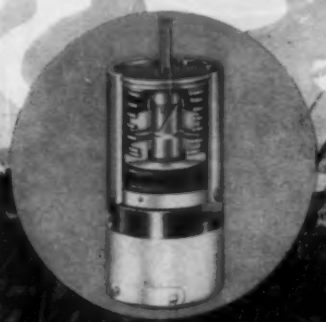
Perfect for all circular or strip chart records from one-hour to 30-day periods. Constant power and timing accuracy are assured since there is no "mainspring" to weaken or run down. Rugged durability and dependability are built into the **GASCLOK** Power Drive for years of service with minimum maintenance. It can provide new metering accuracies and economies for you.

for instrument driving and timing
self-starting • air or gas operated

The versatile ***GASCLOK*** Power Drive is designed and field-tested for long trouble-free operation in remote location installations with all makes and types of recording instruments.

The high-torque, continuous drive provides power for: *Integrating Orifice Meters—Gas Lift Meters—Pressure Recorders Strip Chart Recorders—Telecounter Units—Field Program Timers* and many other instrument applications for accurate, automatic operation.

- **Self-starting mechanism completely self-contained—requires no winding or "priming" of power unit.**
- **Gas or air consumption only 5 cfh—normal operating pressure 5 psi—rotation 2 rpm.**
- **Timing escapement spring rewound every 5 seconds—eliminates fluctuating torque.**
- **Accuracy of timing unaffected by wide fluctuations in supply pressure.**
- **Timing mechanism internally sealed to prevent corrosion and clogging—all power unit parts exposed to gas are aluminum or stainless steel.**
- **Inherently explosion-proof.**
- **Large area internal ports to prevent plugging. All internal ports easily cleaned.**
- **Installation in any position—variety of mounting brackets available.**



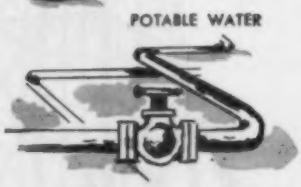
AMERICAN®
METER COMPANY
INCORPORATED (ESTABLISHED 1836)

AMERICAN METER CO EST 1836 MEASUREMENT ENGINEERS

GENERAL SALES OFFICE: Philadelphia 16, Penna. • Albany • Alhambra • Atlanta • Baltimore Birmingham • Boston • Chicago • Dallas • Denver • Erie • Houston • Kansas City • Los Angeles Minneapolis • New York • Omaha • Pittsburgh • San Francisco • Seattle • Tulsa • Wynnewood
IN CANADA: Canadian Meter Company, Ltd., Milton, Ontario • Calgary • Edmonton • Regina
SUPPLIERS TO THE GAS INDUSTRY for Ironcase, Tinned Steelcase, Aluminumcase and Welded Steelcase Meters • American-Westcott Orifice Meters • Instruments • Reliance Regulators • Apparatus • Valves

REMARKABLE *new* RIGID PLASTIC PIPE!

★ Higher Tensile Strength
★ Higher Heat Resistance



MADE OF CYCOLAC® C ABS
ABS TYPE II
Thermoplastic Resin
(NSF APPROVED)

New Thermoplastic Resin from BORG-WARNER

Now there are two types of ABS rigid plastic pipe made of Cycolac, the *tough* thermoplastic. The original Borg-Warner Cycolac L ABS Type I resin has already proved its worth in scores of applications from coast to coast.

The new Cycolac C ABS Type II resin offers increased tensile strength, greater heat resistance and other important advantages over metal. Among these are light weight, ease of installation and protection against corrosion.

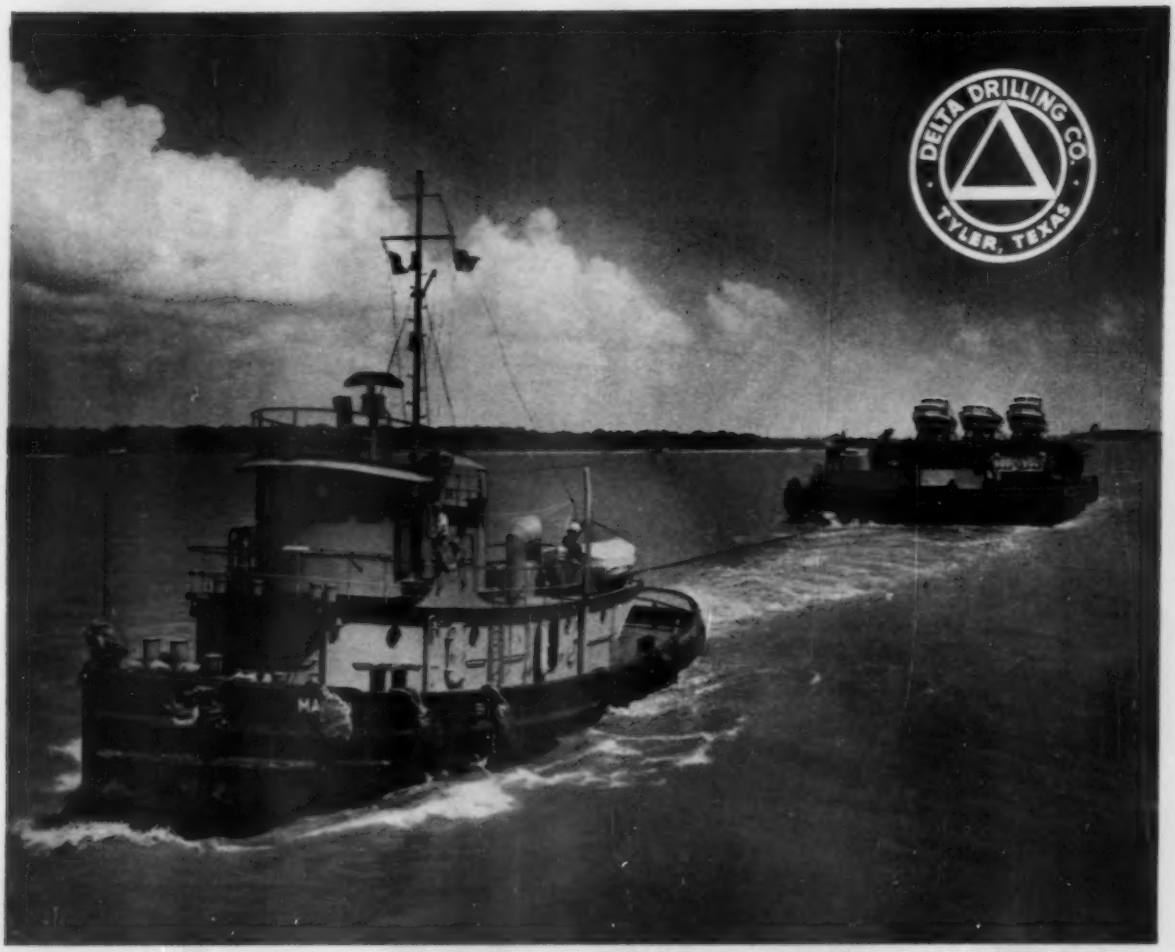
To users of pipe, Cyclolac C offers superior service over a greater range of temperatures with increased chemical resistance.

WRITE FOR NAME OF YOUR NEAREST CYCOLAC EXTRUDER

PACESETTER IN
Marbon CHEMICAL
SYNTHETIC RESINS

DIVISION of BORG-WARNER
WASHINGTON, W. VA. • GARY, INDIANA
also represented by:
WEST COAST: Harwick Standard Chemical Co., Los Angeles, Cal.
CANADA: Dillons Chemical Co. Ltd., Montreal & Toronto
EXPORT: British Anchor Chemical Corp., New York

BW ® Marbon



perforaciones delta, c.a. drilling tender "delta IV" bound for maracaibo

DELTA HAS RIGS OF ALL SIZES FOR ALL DEPTHS AND CONDITIONS...DOMESTIC AND FOREIGN

..plus skilled personnel and 27 years of know-how

Built on a foundation of integrity, Delta Drilling Company and its subsidiaries have the year-after-year experience and modern equipment that can save you time and money.

On land or offshore..in the United States or in foreign countries..you can deal with Delta with complete confidence. Equipment and trained personnel are on the spot.

More, Delta's financial structure permits flexibility in its contracts..including participating interests and foreign currencies.

DELTA DRILLING COMPANY

TYLER, TEXAS

DISTRICT OFFICES:

HOUSTON • LAKE CHARLES • DALLAS • ODESSA • DENVER • PITTSBURGH

SUBSIDIARIES:

DELTA MARINE DRILLING CO. NEW ORLEANS, LOUISIANA

DELTA OVERSEAS DRILLING CO. ROME, ITALY

PERFORACIONES DELTA, C.A. CARACAS, VENEZUELA

CHECK the features of the...

Series 701 Screw End Check Valve Illustrated Series SW701 Socket Weld End Valve also available

GENERAL GP PURPOSE

FORGED STEEL BOLTED BONNET

CHECK VALVES

150-800 POUNDS SERVICE

1. These valves have Stellite* hard faced integral seats
2. 13% Chrome stainless piston checks
3. Stainless steel asbestos spiral wound body-bonnet gaskets
4. Forged steel bodies designed for light weight with maximum strength
5. Available in ¼" thru 2" sizes in both screw and socket weld ends

Address Dept. 24A-FO for literature

HENRY VOGT MACHINE CO., BOX 1918, LOUISVILLE 1, KY.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J. St. Louis, Charleston, W. Va., Cincinnati

Vogt

GENERAL GP PURPOSE

Vogt VALVES & FITTINGS

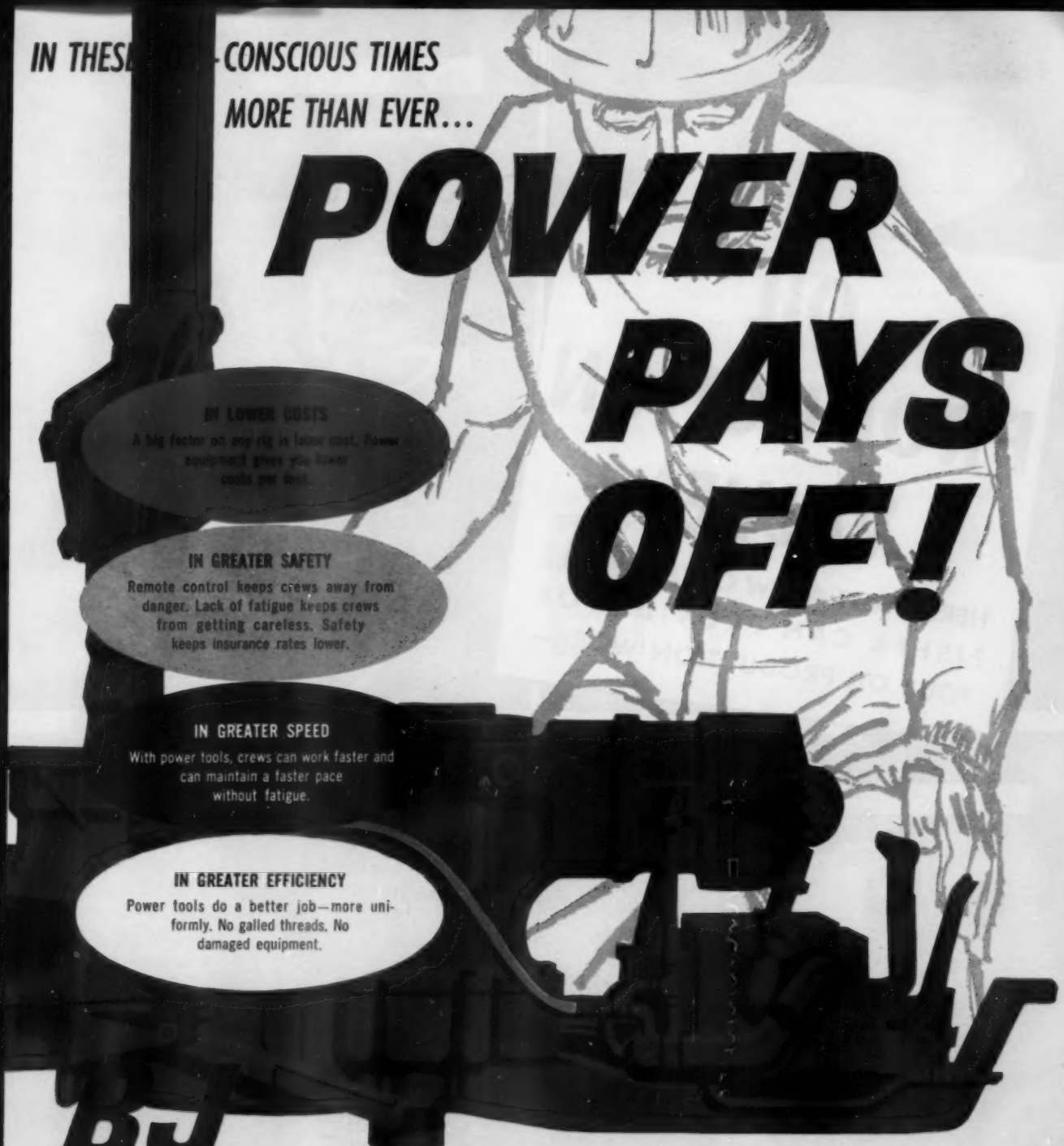
FORGED STEEL VALVES

*Product of Union Carbide Corp.

IN THESE[illegible]-CONSCIOUS TIMES

MORE THAN EVER...

POWER PAYS OFF!



IN LOWER COSTS

A big factor on any rig is labor cost. Power equipment gives you lower costs per foot.

IN GREATER SAFETY

Remote control keeps crews away from danger. Lack of fatigue keeps crews from getting careless. Safety keeps insurance rates lower.

IN GREATER SPEED

With power tools, crews can work faster and can maintain a faster pace without fatigue.

IN GREATER EFFICIENCY

Power tools do a better job—more uniformly. No galled threads. No damaged equipment.

BJ Power Tools

the only Full Line of Power Tools!

In these cost-conscious days, it is more important than ever to increase efficiency, and stretch every drilling dollar to its utmost. The most practical way is with POWER! The more power used on a rig, the lower the cost per foot. Byron Jackson brings the petroleum industry hydraulic and pneumatic muscles to do its job cheaper, faster, and safer with methods that keep rig crews fresh and alert.

Byron Jackson offers you a *full line* of power tools—all a result of BJ research and development—all engineered to work as a team.

For sizes, capacities, and further details, see your BJ representative. And... watch BJ for the newest.

WATCH BJ FOR THE NEWEST

MORE POWER TOOLS ARE ON THE WAY!

Byron Jackson Tools, Inc.

Subsidiary of Borg-Warner Corp.

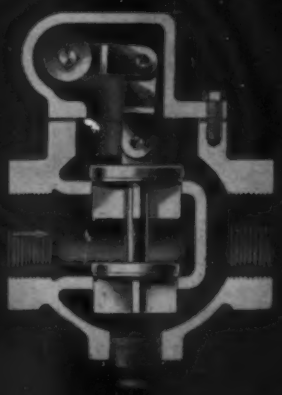
P.O. Box 2017A, Terminal Annex, Los Angeles 54, California • Cable: "BJTOOL"
Export Address: 580 Fifth Avenue, Suite 510, New York 36, New York

FISHER

OIL PRODUCTION VALVES

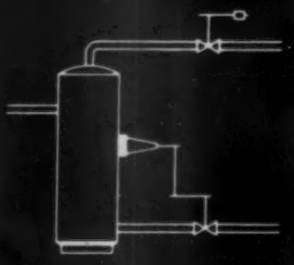
HERE'S JUST A FEW OF THE VALVES FISHER CAN PROVIDE FOR YOUR OIL PRODUCTION WORK—

GAS VALVE



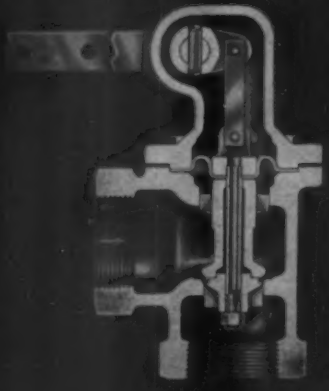
TYPE 9G—an economical and simple separator back pressure valve.

SIZES—Screwed 2", 3" and 4".
Flanged—3" and 4".



Low Pressure Separator Back Pressure Valve

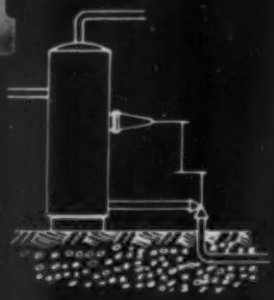
OIL VALVE



TYPE 1907—for low pressure oil and gas separator. Also very successfully used as a water dump valve.

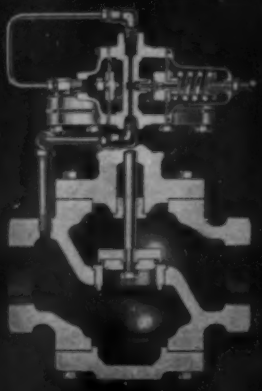
SIZES—Screwed 2" and 3".
Flanged—2", 3" and 4".

Water Dump Valve On Tank



Separator Low Pressure Oil Valve

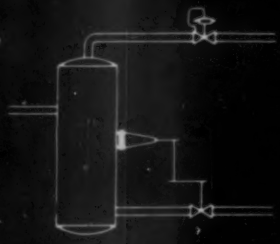
BACK PRESSURE VALVE



TYPE 63—here's a pilot operated valve that will give close regulation and tight shut-off.

SIZES—Screwed 2".
Flanged—3" and 4".

Field Back Pressure Valve



Separator Low Pressure Back Pressure Valve

FISHER GOVERNOR COMPANY
MARSHALLTOWN, IOWA · WOODSTOCK, ONTARIO
LEADS THE INDUSTRY IN RESEARCH FOR BETTER PRESSURE AND LIQUID LEVEL CONTROL

OVER 40,000 HOURS WITHOUT OVERHAUL

is "Jimmy" Diesel record on Richfield Rig #10

Since the Fall of 1953, 17 "Jimmy" Diesel engines on Richfield Oil Corporation's Rig #10 have each run over 40,000 hours without overhaul. And to date the rig has drilled approximately 200,000 feet of hole (using $4\frac{1}{2}$" pipe) to depths ranging from 9,000 to 16,000 feet.

Tool pusher E. R. Barker reports: "The GM Diesels on this rig have run over 40,000 hours and have done an excellent job. They've saved us a lot of drilling time because they pick up their load fast and get us out of the hole and back in record time. And their smaller size and lighter weight make it easier to tear down, move and set up."

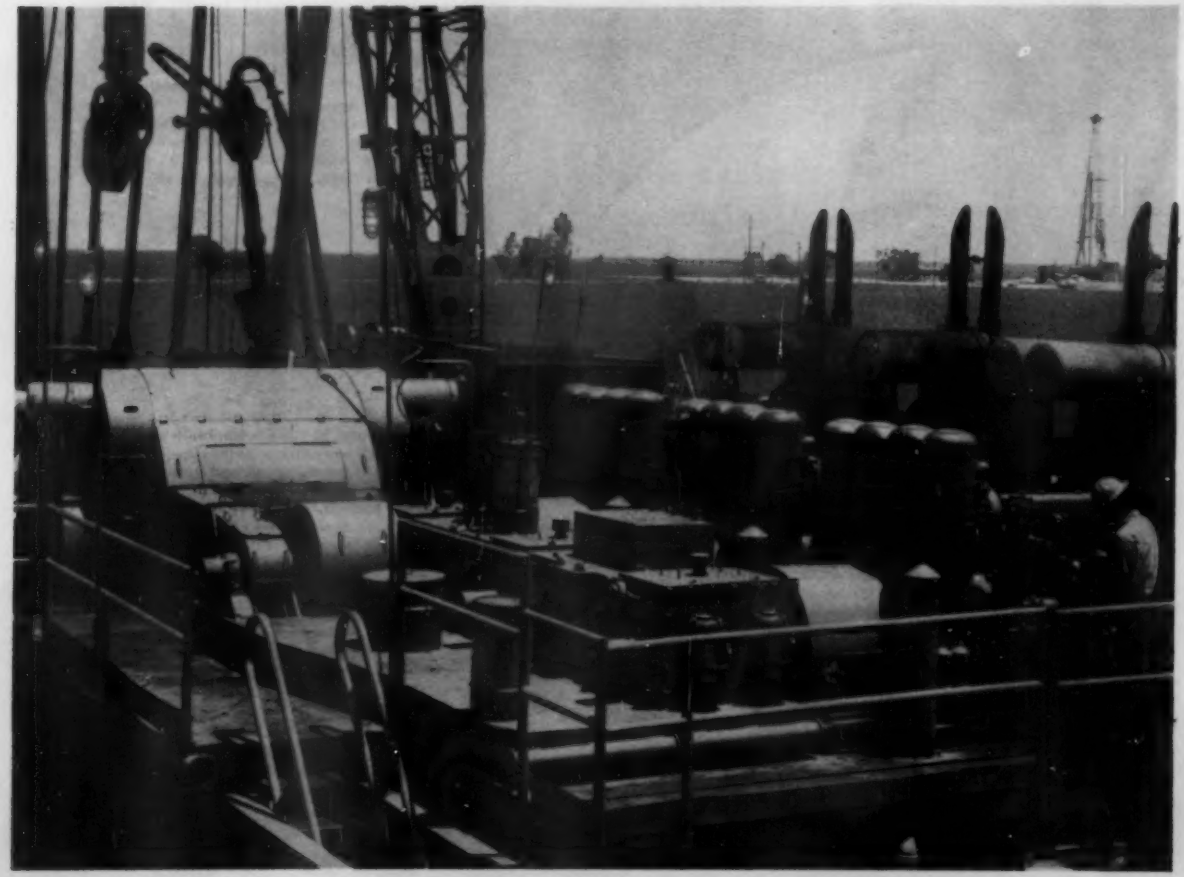
Performance like this explains why you find more "Jimmy" Diesels at work in the oil fields than any other. These rugged 2-cycle Diesels can be depended upon to make hole faster, without costly downtime. They're compact, easy to move. And when service or parts are needed, you get them fast! Single and multiple engine units from 32 to 893 H.P.

DETROIT DIESEL ENGINE DIVISION OF GENERAL MOTORS, DETROIT 28, MICH.

GM GENERAL MOTORS DETROIT DIESEL POWER

Regional Offices: New York, Atlanta, Detroit, Chicago, Dallas, San Francisco

Factory Engineered Parts . . .
Factory Trained Servicemen Everywhere



Richfield Oil Corporation Rig #10, operating near Bakersfield, Calif. Oil-well draw works and Emsco pumps powered by 3 "6-110" GM Diesel Twins, 4 "6-71" Twins, 1 "6-110" single. Four "6-71's" power electric generators and Hopper Hoist

T F

Precision Press Forgings (as well as Hammer Forgings and Extrusions) are made in quantity on a production basis as missile, rocket and engine components, heavy machinery parts, etc. This 64⅜" OD x 1⅓" wall thickness press-forged stainless steel part is a Heat Sink for a long range missile.

TAYLOR

This 42" OD x 16" long Stainless Steel Jet Engine Turbine Case is representative of products formed by Taylor Forge ring rolling methods. Seamless rings are made in sizes to 120" OD with practically any required section.

Forged Headers with contoured outlets, made with any required outlet arrangement, are widely used for valve settings, gas compressor station manifolds, scraper traps, refinery charge heater headers, and many other applications in gas, oil and process piping. They are also made in heavy wall thicknesses for high pressure-temperature central power station service.

Electric Fusion Welded Pipe is made in sizes from 14" OD to 96" OD with wall thicknesses to 1.531", and in a variety of materials (including stainless and alloy steels). This pipe offers many opportunities for substantial economies, particularly in high pressure-temperature services and also in pipeline river crossings and other applications involving special design requirements. Pipe pictured is 16" OD x 1" wall thickness and is stainless steel.

SERVING INDUSTRY with many essential products

FORGE

Traditionally Dependable

Perhaps you think of Taylor Forge only as a maker of highest quality Welding Fittings and Forged Flanges—and certainly they are most important lines with us. But Taylor Forge is also an outstanding producer of many other less widely known though equally essential products.

The few examples pictured here are representative of the many diverse parts made by Taylor Forge to serve American Industry. One thing they have in common is the dependability, the integrity, that has always been associated with the name TAYLOR FORGE.

Taylor Forge & Pipe Works

General Offices and Works: P. O. Box 485, Chicago 90, Illinois
Plants at: Carnegie, Pa., Gary, Ind., Houston, Texas, Fontana, Calif., Hamilton, Ont., Canada
District Sales Offices: New York, Boston, Philadelphia, Pittsburgh, Atlanta, Chicago, Houston, Tulsa, Los Angeles, San Francisco, Seattle, Toronto, Calgary, Montreal.

Taylor Forge was America's first and is still the foremost manufacturer of Welding Necks, Nozzles, Large Diameter Flanges and similar boiler, heat exchanger and other pressure vessel components. Such parts are made in any size and material for any service condition.

Spiral-Weld Pipe, our original product, (first made as spiral riveted pipe nearly 60 years ago), remains to this day a major item and its use continues to expand. Its money saving features are widely recognized in services such as gas gathering lines; gas, oil and water well casing; irrigation pipe; water piping in sand, gravel and mining operations; and in fact, wherever the use of light weight pipe is indicated. It is also widely used as pipe piling.

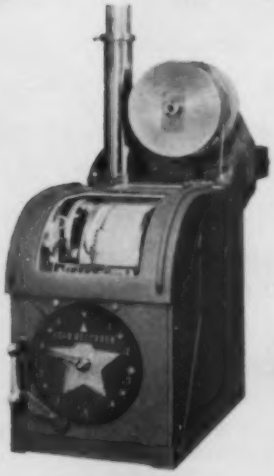
another Eastman contribution to saving drilling time and expense

accurate

It's a matter of record

...EASTMAN Star Recorder is the most dependable well logging instrument ever built!

The new Eastman Star Recorder gives you all the facts on important phases of your drilling. With a single pen it simultaneously records clearly and positively: Rate of penetration in minutes per foot, with extended lines indicating each 5 foot interval; time bit is raised off bottom; time on bottom drilling; time required for connection; down time; time bit is changed and time required; time coming out of and/or going in the hole; correlation and computation of drilling time against off-bottom time in one continuous record. Here is another example of Eastman's development program . . .



. . . dedicated to progress through advanced engineering . . . research . . . and service to the Petroleum Industry.

EASTMAN

EASTMAN OIL WELL SURVEY COMPANY
LONG BEACH • DENVER • HOUSTON • CALGARY

For Export Write
EASTMAN INTERNATIONAL DIVISION
P. O. BOX 1500, DENVER 1, COLORADO, U. S. A.

DIRECTIONAL DRILLING • OIL WELL SURVEYING • SIDETRACKING

THIS LIST OF ADVANTAGES

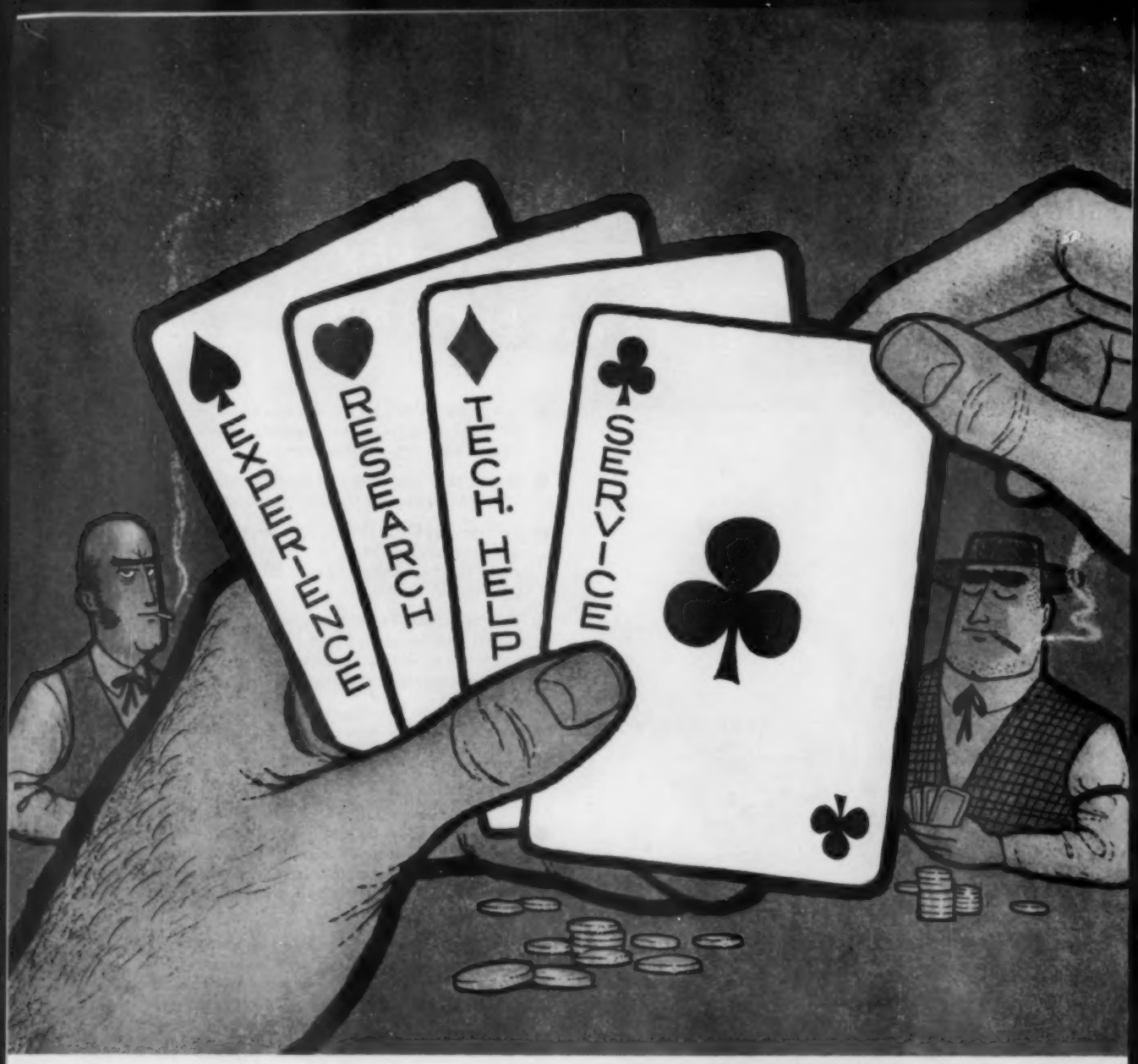
Tells you why NORTHWESTS are better on the Pipeline!

- Northwest Crawler design has been proved in miles of leap frogging on pipeline work. Northwest brings you dependable travel.
- Northwest simplicity of design makes upkeep easy in the far away spots that pipelines go through.
- The Helical Gear Drive from the engine, mounted on anti-friction bearings, enclosed and running in oil—gives long life and eliminates adjustments required with chain drives.
- The "Feather-Touch" Clutch Control gives power control of the main drum clutches without the complication of delicate mechanism such as compressors—pumps—valves or long lines of tubing.
- The Cushion Clutch eliminates shock overloads before they reach operating machinery—not after.
- Uniform Pressure Swing Clutches take the jerks and grabs out of swinging and assure smooth, safe, accurate fast spotting of loads.
- Northwest Dual Independent Shovel Crowd utilizes force that most independent crowd shovels waste—one of the outstanding reasons why Northwest Shovels are recognized everywhere as a *real* Rock Shovel.
- Cast Steel Machinery Bases and Machinery Side Frames give a rigid foundation that maintains shaft alignment and insures longer life and lower maintenance costs. Ball and roller bearings on high-speed shafts assure the maximum transmission of power.
- A wide range of equipment permits you to meet any crane condition. You can have worm boom hoists or independent high-speed boom hoists with power controlled lowering, removable counterweight, easy-lowering pivoted-type gantries and one, two or three load lines.
- Machines convertible to Pullshovel operation with maximum digging depths and reach. There is a wide range of dipper widths and dipper capacities to choose from. Northwest pioneered the Pullshovel and brings you a proved unit for rugged job conditions.
- Space does not permit telling the whole story. Ask for complete details. You can't get the Northwest combination of advantages anywhere else at *any* price.

NORTHWEST ENGINEERING COMPANY
1513 Field Bldg., 135 South LaSalle Street, Chicago 3, Illinois

G-27-ICG

NORTHWEST



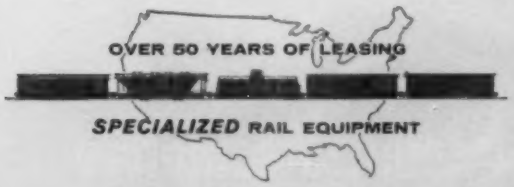
In the catalyst game
Davison deals you the winning hand

The game of *catalysts* is different from poker, in that it doesn't depend on luck. You've got to have the cards, or you can't make out. Davison *has* the four winning cards to deal you (count 'em!): ♠Experience, based on year-in, year-out production of quality catalysts; ♥Basic research, at our new, thoroughly staffed and equipped Grace Research Center at Clarksville, Md.; ♦Technical assistance when you need it, from a seasoned, competent staff of technical advisers; ♣Quick service from *four* Davison plants conveniently located to deliver catalysts where, and *when*, you need them. So, if you're interested in catalysts, try Davison. They'll deal *you* a winning hand every time!

W.R. GRACE & CO.
DAVISON CHEMICAL DIVISION
BALTIMORE 3, MARYLAND

Buy DAVISON—the quality catalyst backed up by experience, research, technical assistance, service!

Top companies rely on North American leased equipment for economical, investment-free shipping. You'll find our diversified fleet offers covered hoppers and tank cars especially designed for transporting petroleum, *your* type of chemicals and allied products. *Remember*—North American brings you specialized, first-hand, applied knowledge of bulk shipping by rail . . . backed by over half a century of experience in railroad car leasing. And we are ready to serve you and your company.



NORTH AMERICAN CAR CORPORATION

231 South LaSalle Street, Chicago 4, Illinois

A NATIONWIDE ORGANIZATION WITH BRANCH OFFICES IN IMPORTANT MARKET CENTERS

DALLAS • FOND DU LAC • ST. PAUL • ST. LOUIS • SAN FRANCISCO • NEW YORK

From downhole to consumer carburetors . . .

Protected from Corrosion with UNICOR®

Yes, from pumping equipment through pipeline, through refinery, Unicor gives oil-soluble, water-repellent protection from corrosion.

You can readily see what this means in terms of money saved on equipment replacement and repair. You can realize greater profit, too, from continued full-stream production.

When added at the refinery, Unicor's protection includes tanks, vessels, piping and extends even to consumer equipment.

And for all this, Unicor costs only about one-tenth of a cent per barrel of product. For help with your corrosion problems, or for samples of Unicor for testing in your own laboratories, write or phone our Products Department.

UNICOR® *One of the UOP family of superior additives and inhibitors for the petroleum industry.*

UOP **UNIVERSAL OIL PRODUCTS COMPANY**

30 Algonquin Road, Des Plaines, Illinois, U. S. A.

NEW MOTOROLA T-POWER 2-WAY RADIO

Transistorized Power Supply for both receiver and 25-watt transmitter

Long Life Transistors Replace the Vibrator . . . Reduce Maintenance and "Down-Time"

Already famous for the lowest maintenance and operating costs in the 2-way mobile radio field, Motorola mobile radio is an even better investment now—with the T-POWER unit. The vibrator is gone! . . . replaced by rugged long-life transistors. Gone, too, is the problem of frequent vibrator replacement. Here is a mobile radio with an all-electronic power supply.

New Mounting Flexibility with Plug-In Control Head . . . Same Basic Unit can be Used for Front or Trunk Mounting

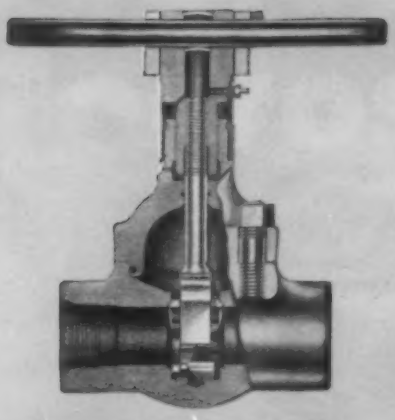
With the T-POWER radio, you are no longer restricted to one type of mounting. Install the complete radio, with drawer unit and plug-in control head, for under-dash mounting. For rear mounting the same basic drawer unit can be installed in the trunk and connected by cable to a dash-mounted control head. And—the same basic drawer unit can be interchanged with the equivalent Motorola Twin-V trunk mount radio models operated from a 12-volt negative ground source.

T-POWER radio is another example of Motorola's continuing leadership in the practical application of transistors in mobile radio. Other tested and proved transistorized products include the Dynamic Microphone and Power Voice Speaker.

Get all the facts.—Write now for literature with complete information.

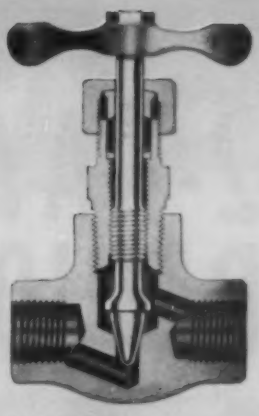
MOTOROLA Communications & Electronics, Inc. • 4501 Augusta Blvd., Chicago 51, Illinois • A Subsidiary of Motorola Inc.

Rockwell-Built Edward Steel

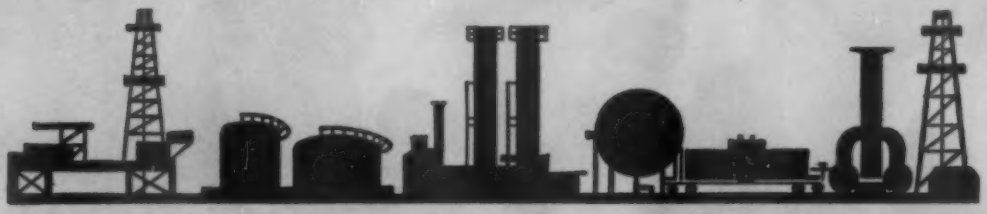


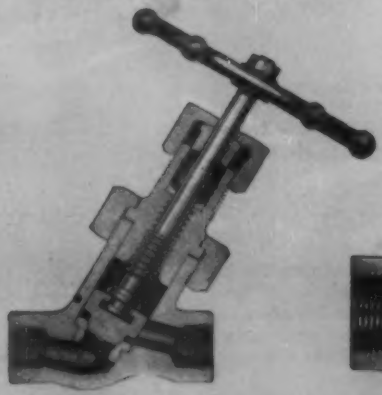
MUDWONDER MUDLINE VALVES
Figs. 2128-3128
For pressures to 2,000-3,000 lb WOG
Bolted bonnets, screwed or flanged ends

GLOBE STOP VALVE
Fig. 138
For pressures to 10,000 lb WOG
Screwed bonnet, screwed or socket welding ends

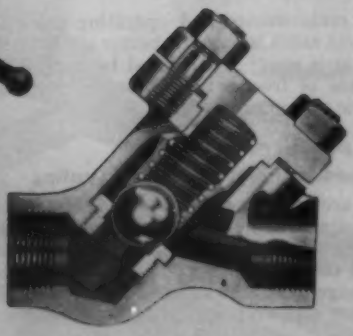


GLOBE GAGE VALVE
Fig. 152
For pressures to 4,000 lb WOG
Screwed or union bonnet, screwed ends

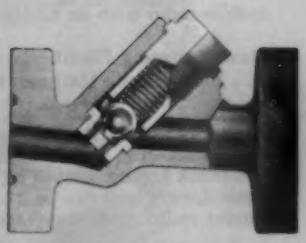




GLOBE STOP VALVE
Fig. 2698
For pressures to 2,000 lb WOG
Union bonnet, screwed or socket welding ends



BALL CHECK VALVE
Fig. 4632
For steam pressures to 600 lb A.S.A. (2,000 lb WOG)
Horizontal or vertical
Bolted cover, screwed or socket welding ends



BALL CHECK VALVES
Figs. 5160-9160
For pressures to 5,000-10,000 lb WOG
Horizontal or vertical, screwed covers, flanged ends

Valves Work Everywhere

in drilling...production...refining...

Edward valves are on the job, no matter where you look. From the towering derricks of Northern Alberta to offshore rigs on the Gulf . . . from refineries on the Jersey Flats to California natural gas plants . . . the word is—"You buy a better valve from Edward!"

Edward Globe Valves

Bodies are drop-forged steel, for greater strength and resistance to erosion. Large-diameter handwheels permit operation without a wrench or cheater; cross-arm Impactor* handle for quick, tight closing is standard on 2" Fig. 158. Figures 158 and 2698 have replaceable seats. Disks—both plug and needle types—are carefully aligned, and seats are lapped for tight sealing. Stems are EValloy,* an exclusive Edward stainless steel, centerless ground to a fine finish. Carefully machined Acme stem threads assure easy operation. Bonnet threads plated by an exclusive EValizing* process for maximum resistance to wear and corrosion. Deep stuffing boxes, with exclusive EValpak* asbestos-graphite packing, assure a tight seal with minimum resistance to stem turning.

Edward Ball Check Valves

Identical to Edward globe stop valves in body and seat features. Rolled steel bonnet with integral ribs to guide ball accurately. Ball is corrosion-resistant high carbon stainless steel, precision-ground for tight seating. High carbon stainless steel spring gives positive aid in seating ball.

Edward Mudwonder Valves

Body and bonnet are high-strength alloy steel with heavy body-bonnet cover flanges. Accurately machined to assure drop-tight sealing under extreme pressures. Double-threaded yoke bushing, completely enclosed, gives 2-to-1 ratio. Corrosion-resistant stainless steel stem with slotted gate coupling to eliminate bending or binding. Gate is hard chrome plated to reduce friction, resist erosion and abrasion. Seat insert of resilient buna-N synthetic rubber, molded integrally over steel wear rings. Seat and gate easily replaced without removing Mudwonder* from line.

WHERE CAN YOU USE EDWARD VALVES?

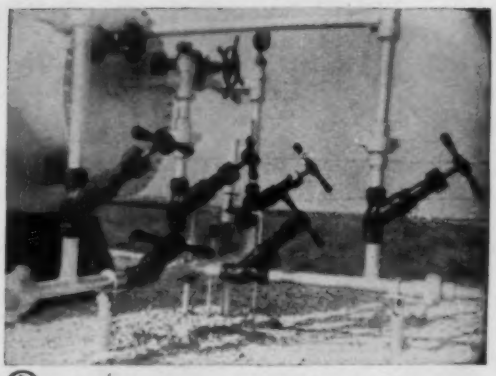
Our customers report complete satisfaction in the use of Edward valves for water flood service . . . throttling . . . on high-pressure heaters, treaters and separators . . . on pressure vessel controls . . . on headers and flow lines to heaters and exchangers . . . for manifold service . . . in gasoline or gas sulfur extraction plants . . . for "unloading" valves at gas compressor stations . . . and in many other applications. You name your need . . . let your Edward representative show how to fulfill it with versatile, economical, completely dependable Edward valves. They are available from your favorite oil field supply store, from your industrial distributor, or direct from *Edward Valves, Inc., 1212 W. 145th Street, East Chicago, Indiana* (Subsidiary of Rockwell Manufacturing Company). Represented in Canada by Lytle Engineering Specialties, Ltd., Montreal, and Rotary Sales & Service, Ltd., Edmonton.

EDWARD STEEL VALVES

another fine product by

ROCKWELL

Edward builds a complete line of forged and cast steel valves from ¼" to 18"; in globe and angle stop, gate, non-return, check, blow-off, stop-check, relief, hydraulic, instrument, gage and special designs; for pressures up to 10,000 lbs; with pressure-seal, bolted, union or welded bonnets; with screwed, welding or flanged ends. *T.M. Reg. U.S. Pat. Off.



Edward 2" Fig. 158 valves in service on heater by-pass lines in Louisiana oil fields. Note Impactor handles for quick, easy closing against high pressures.

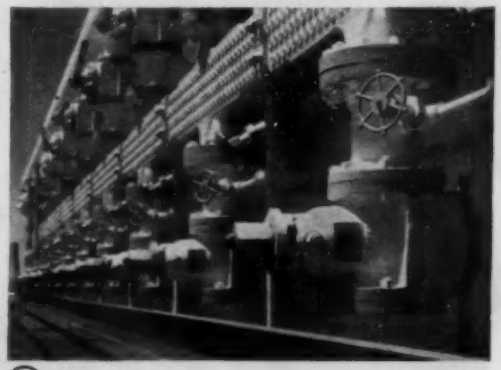
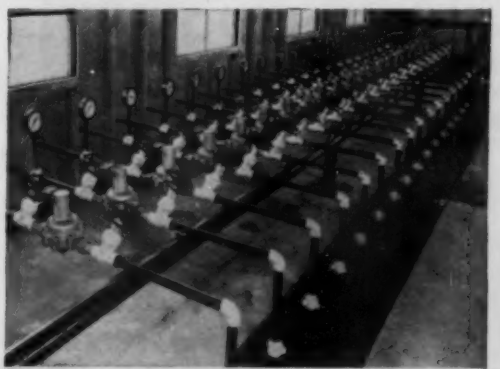


Fig. 2698 valves on cooling coils of natural gas cooler. Scene: New Mexico field processing plant. Lubricated plug valves in photo are Rockwell-Nordstrom.



Forty-two Edward forged steel globe valves (Fig. 2698) throttle the flow on this West Texas water flood. Owner reports absolutely no maintenance costs in two years (over 4,000,000 barrels of water)!

"$7,000,000 rig... and the rotary hose is U.S. Royal 4"

reports "Red" Royal

That's "Red Royal" being hoisted aboard Mr. Gus II, world's largest offshore drilling rig. Owned by the C. G. Glasscock Drilling Co., Mr. Gus II has record-breaking statistics: it operates in depths up to 150 feet, has air-conditioned quarters on all 3 decks to accommodate 66 men, has a length of 259 feet (including anchor supports and space for helicopters) and 8000 barrels capacity drilling water.

Because this hard-working mammoth requires the champ rotary hose in the industry, U.S. Royal 4 was selected—not only for its unequalled record on barge rigs, but also for its performance in the patches throughout the oil fields.

For rolling up top footage, no matter how tough the going, specify U.S. Royal 4 Rotary Hose. It's built to handle the highest pressures on today's pumps—which means you can use it all the way from spud to pay.

Available in all fields at supply stores.

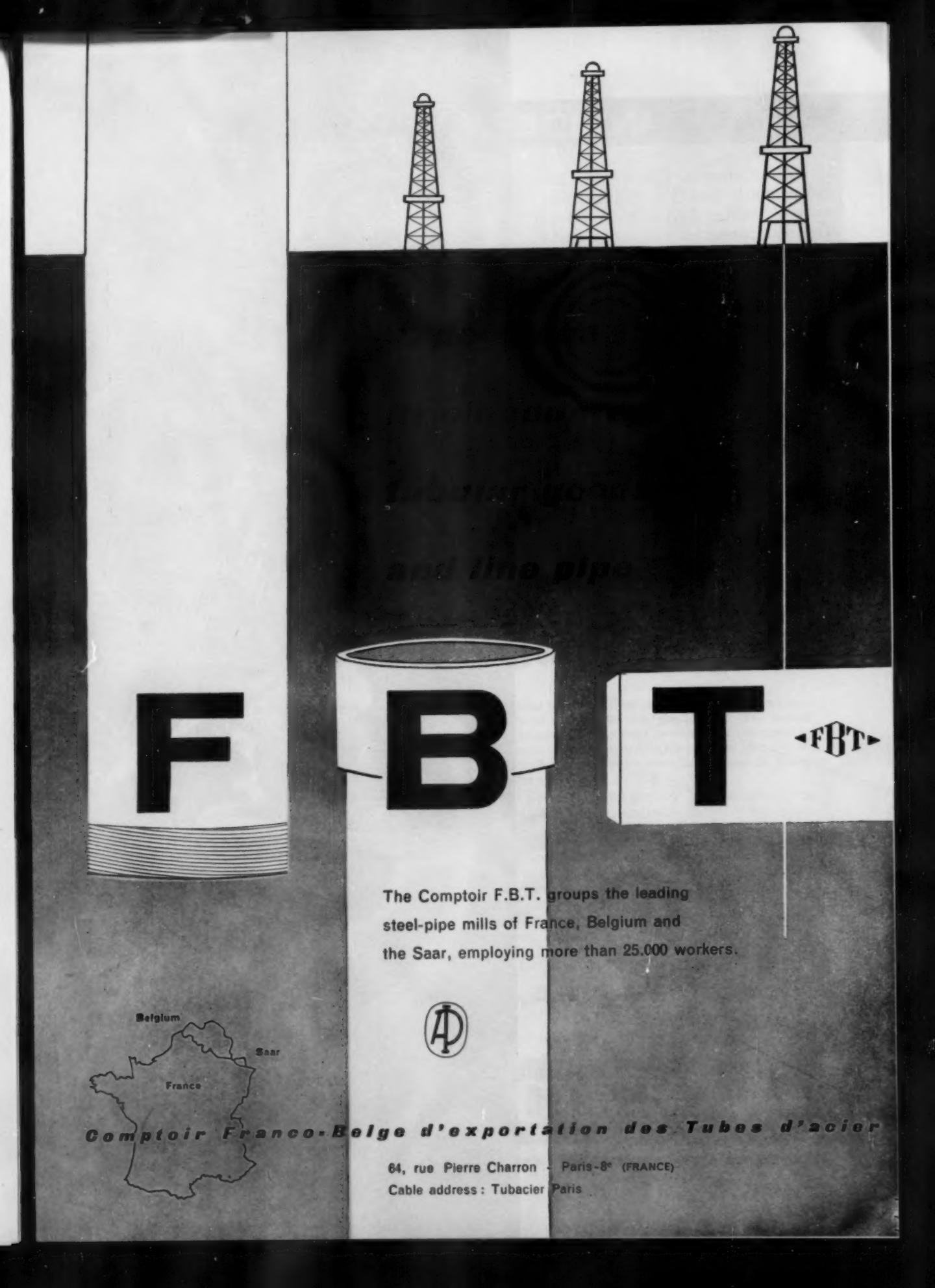
US RUBBER

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

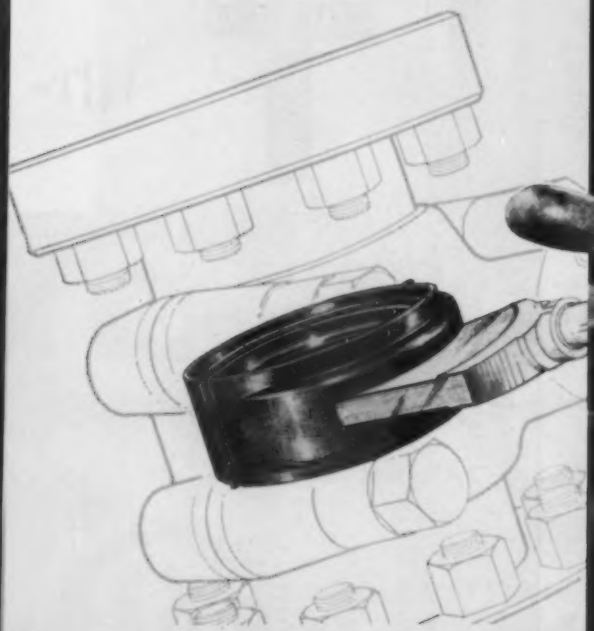

F
B
T
FBT
The Comptoir F.B.T. groups the leading steel-pipe mills of France, Belgium and the Saar, employing more than 25.000 workers.
Belgium
Saar
France
Comptoir Franco-Belge d'exportation des Tubes d'acier
64, rue Pierre Charron - Paris-8e (FRANCE)
Cable address : Tubacier Paris

WHAT'S INSIDE A MUD VALVE?

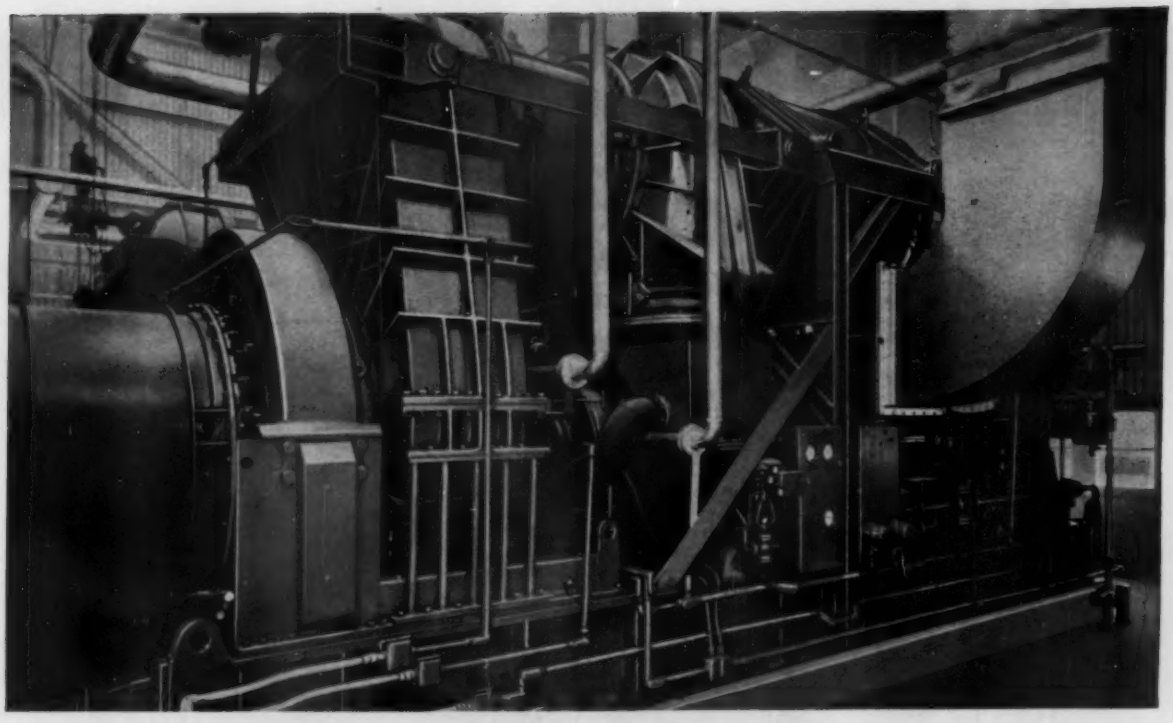
If it's a Cameron Flex-Seal Mud Valve, you'll find The Biggest Reserve of Rubber in Any Mud Valve. The seat packer of tough but resilient Hycar synthetic rubber is what makes a mud valve a mud valve. But to eliminate frequent repair there must be plenty of reserve rubber to take the beating that high pressure, pulsating abrasives will give a valve in mud line service. Ask anyone who has made a comparison — you will find that Cameron Flex-Seals have many times the reserve rubber of other mud valves. You will find, too, that they not only have the longest wear, but they are also easier to repair. Of course more operators COUNT ON CAMERON Flex-Seal Mud Valves.

Cameron
IRON WORKS, INC.
P. O. Box 1212 - Houston, Texas

Export Office: 7912 Empire State Bldg., New York City. In England: Cameron Iron Works Ltd., 76 Grosvenor St., London W. 1 England.



THE BIGGEST RESERVE OF RUBBER IN ANY MUD VALVE



In BUTADIENE APPLICATION Clark Gas Turbines supply regeneration air

Odessa Butadiene Company's new plant at Odessa, Texas, integrates two Clark Model 305 gas turbines in the butadiene process by using them to furnish regeneration air to the dehydrogenation unit. These turbines operate in parallel, along with a Clark 3900 HP centrifugal compressor, and discharge air at 950°F and 22 PSIA into a direct fired heater, then to the reactor catalyst beds where the air removes carbon and replaces heat lost in the endothermic dehydrogenation reaction. This regeneration air is then directed to two waste heat boilers where it generates 186,000 pounds per hour of 250 psi steam.

Clark gas turbines were selected for this application because of better over-all plant economics which resulted from savings in fuel coupled with lower maintenance and operating costs. This plant is an operating testimonial of the dependability and versatility of the Model 305 gas turbine. The power turbine has been removed to allow the hot pressurized gases to be exhausted to the process, rather than convert the energy of the gases to mechanical power as is normally done.

Other services in which Clark gas turbines are in continuous operation are: catalytic reforming, ethylene production, and power generation. In the very near future, additional units will be used in repressuring projects in the Near East and Venezuela.

Clark gas turbines are available in sizes of 1150 to 9300 HP, and are precision engineered and built for the ultimate in dependable and economical heavy duty service. For complete information on Clark gas turbines, contact your nearby Clark representative, or write today for Bulletin 163-1 to Clark Bros. Co., 1115 Lincoln Avenue, Olean, New York.

Odessa Butadiene Company is owned jointly by El Paso Natural Gas Products Company, W. D. Noel and E. G. Rodman of Odessa, and the United Carbon Company.

CLARK BROS. CO.

One of the Dresser Industries

Sales and service outlets in principal cities throughout the world

CLARK®

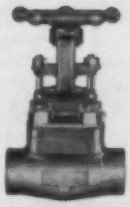
COMPRESSORS • GAS TURBINES

RING OF STEEL

Defies Pressure Times Ten

The Flexitallic gasket in the bonnet joint of Hancock Steel Gate Valves cannot blow out even if pressures exceed ten times the rating of the valve. Valve maintenance and equipment down-time are greatly reduced. Made of a spiral-wound ribbon of stainless steel with asbestos filler, the gasket has spring-like compressibility — cannot be flattened.

Only the specially-designed Hancock bonnet joint with built-in compression limit can make full use of the positive sealing power of this ring of steel. Such advanced valve engineering is one example of total Hancock quality that assures trouble-free performance. Your nearby industrial supply distributor will gladly explain every economy feature of Hancock Steel Gate Valves. Phone him today.



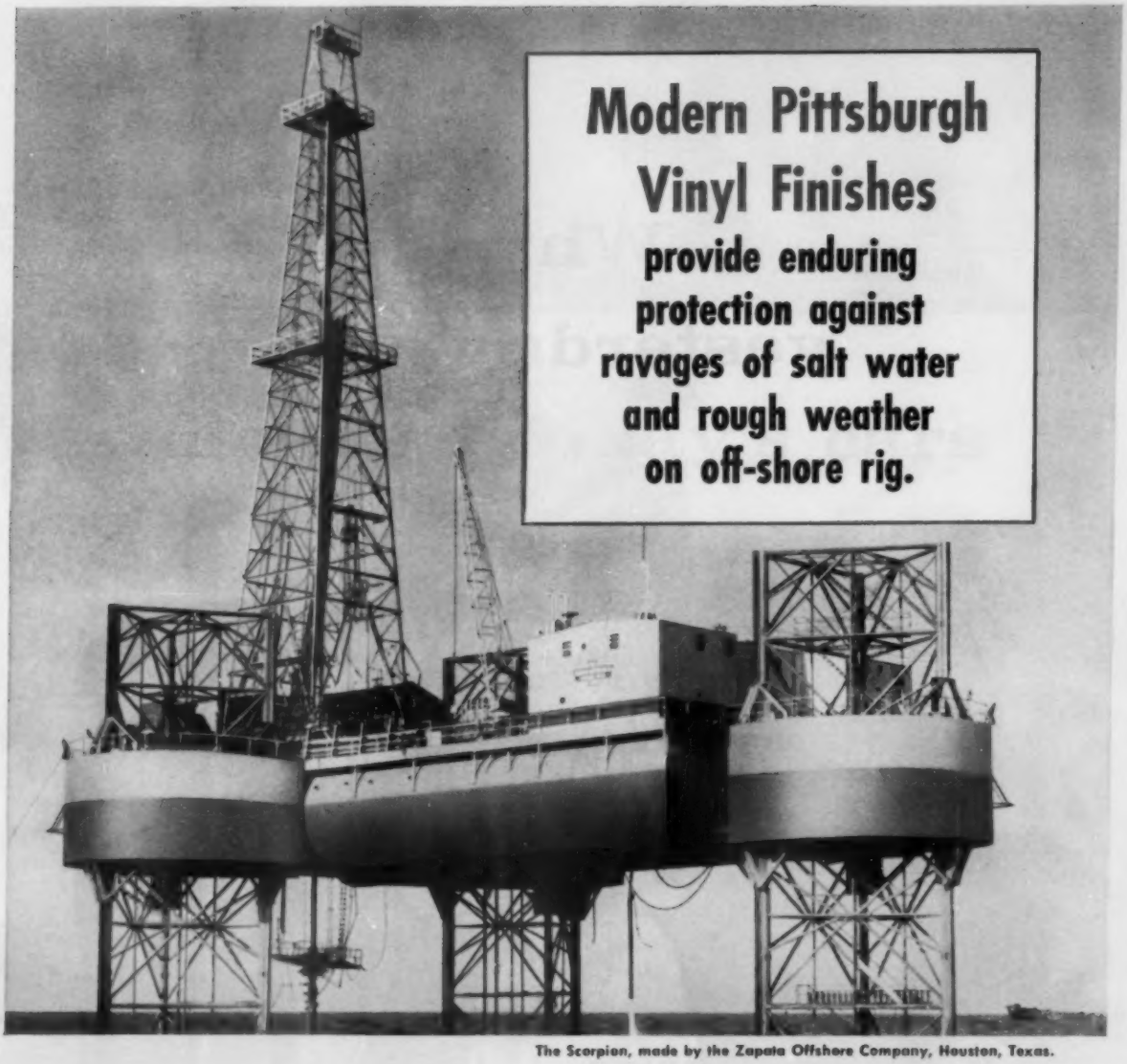
Hancock 800# Steel Gate Valve, Type 950. Sizes: ¼" thru 2".

HANCOCK STEEL VALVES

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Watertown, Massachusetts
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario



Modern Pittsburgh Vinyl Finishes

provide enduring protection against ravages of salt water and rough weather on off-shore rig.

The Scorpion, made by the Zapata Offshore Company, Houston, Texas.

Extraordinary ruggedness and durability of Pittsburgh vinyl-based finishes make them highly suitable for use on off-shore drilling rigs and platforms. An excellent example of their outstanding performance under severe service conditions is the Scorpion, operated by the Zapata Offshore Company, of Houston, Texas.

● **On this equipment,** Pittsburgh vinyl finishes successfully resist the corrosive effects of moisture, salt water and air, acids, alkalis, and greases. They withstand the ravages of rough weather.

● **The refinishing processes** used on the Scorpion consisted of Pittsburgh's four-coat vinyl system over sandblasted steel. Metal and surface preparation included Polyclutch Wash Primer, UL-28114. This was followed by intermediate Brown Primer, UL-28188 and Red Intermediate Coat, UL-28187. The job was completed with a finish coat of long-lasting Gray Vinyl, UL-28189.

● **These modern** vinyl coatings are but one group of a wide variety of special finishes Pittsburgh provides for the many needs of the petroleum industry. Our wide experience in this and many other industries often can save you time and money. Why not discuss your finishing problems with us? Write, wire or phone Pittsburgh Plate Glass Company, Industrial Finishes Division, 1 Gateway Center, Pittsburgh, Pa.

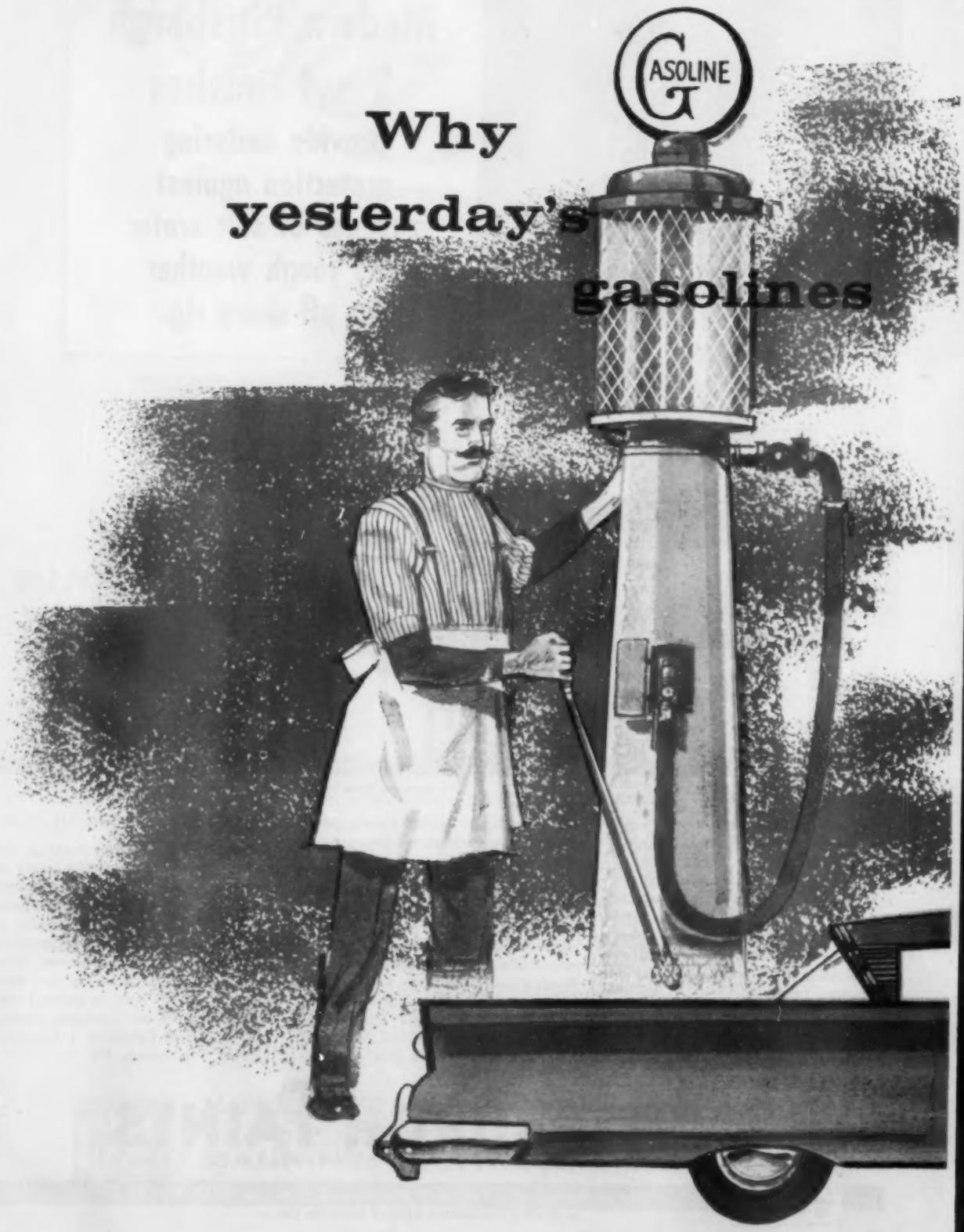
PITTSBURGH® PAINTS

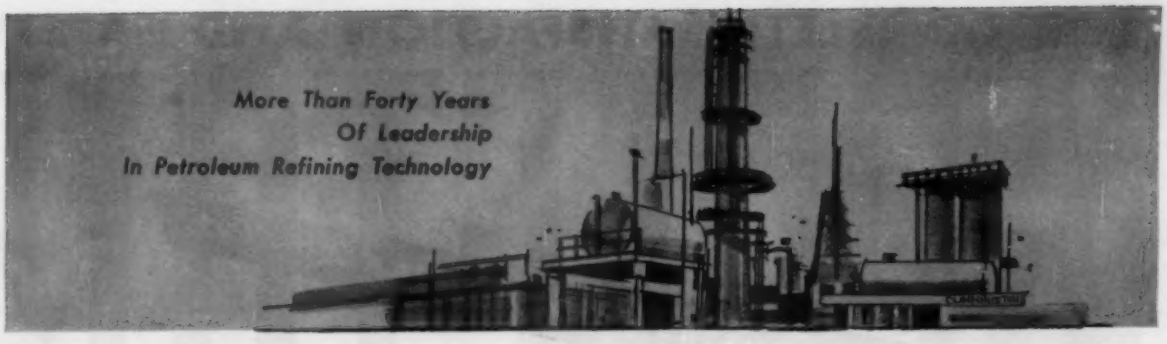
SYMBOL OF SERVICE FOR SEVENTY-FIVE YEARS

75th ANNIVERSARY 1883—1958

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED


Why
yesterday's
gasolines
GASOLINE



won't power today's cars

Your modern car is a high-precision machine—made possible by high-precision gasoline. Especially refined and formulated for high-compression engines, it is this gasoline that gives today's car its smooth, knock-free power.

Extremely important in the vast strides made in gasoline refining are the services furnished the petroleum industry by Universal.

Development of increasingly effective processes and products for producing cleaner-burning, high octane gasoline . . . training of refinery personnel . . . comprehensive field and laboratory service to help the refiner achieve peak operating efficiency and product quality . . . these are among the services rendered by UOP to petroleum refiners the free world over.

It is through services like these that today's gasoline and today's cars have reached their high standards of performance.

UNIVERSAL OIL PRODUCTS COMPANY

UOP

30 ALGONQUIN ROAD, DES PLAINES, ILLINOIS, U.S.A.

FOR COMPLETE SATISFACTION AND SAFETY

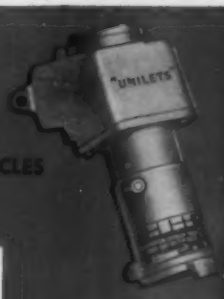
APPLETON

INDUSTRY'S MOST ADVANCED LINE

EXPLOSION-PROOF EQUIPMENT

JUNCTION UNILETS

LIGHTING FIXTURES



RECEPTACLES

SWITCHES

Explosion-proof electrical equipment is more important today than ever before. Manufacturers of material handling equipment are adding explosion-proof switches and connectors to be used in hazardous areas. And, an ever increasing number of industrial plants are almost entirely equipped with explosion-proof electrical equipment. Appleton's full line of explosion-proof electrical equipment is the result of extensive laboratory development and field tests, with your individual safety requirements in mind. Proven acceptance and use by leading companies the world over is your assurance that APPLETON is...

TODAY, MORE THAN EVER...

The Standard for Better Wiring®

LINE STARTER UNILETS

FLEXIBLE COUPLINGS

EXPANSION UNIONS

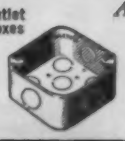
CIRCUIT BREAKER UNILETS

Sold Through Franchised Distributors Only

APPLETON ELECTRIC - PRODUCTS®

Also Manufacturers of

Industrial Lighting



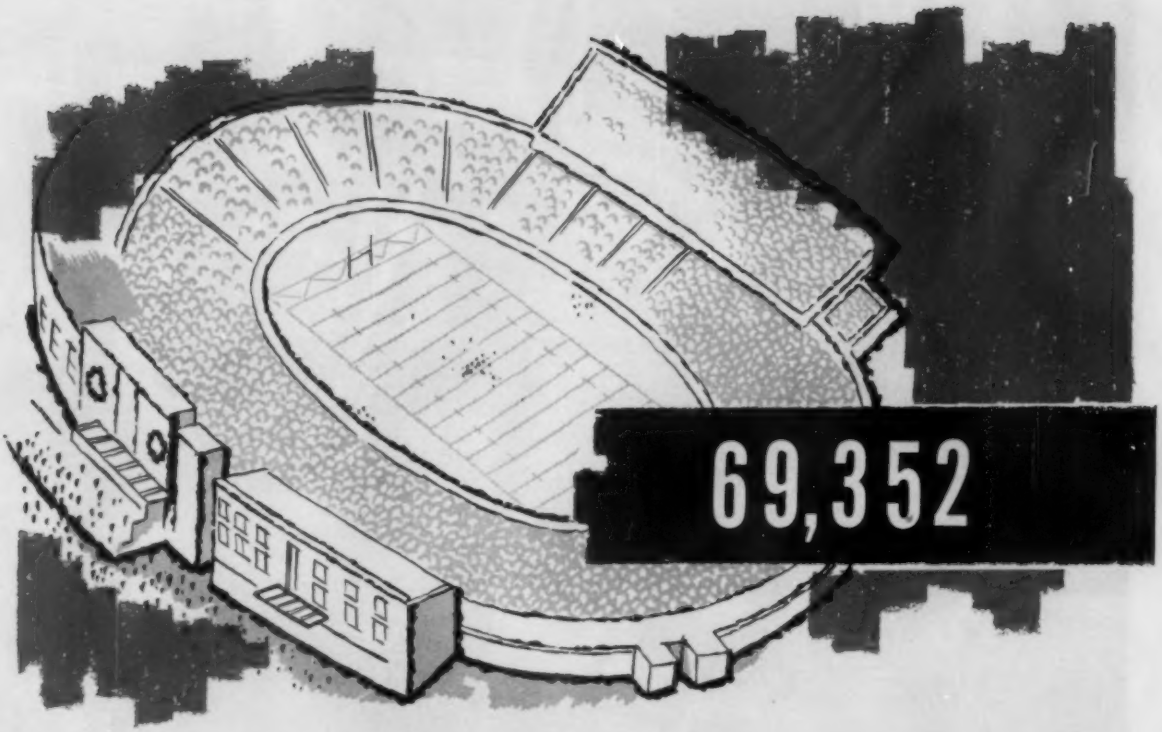
Outlet Boxes

"ST" Series Connectors

Malleable Iron Unilets & Covers

Automatic Reelites

APPLETON ELECTRIC COMPANY 1704 Wellington Avenue, Chicago 13, Illinois



. . . Almost enough to fill the Cotton Bowl

That's the number of injured workmen who received medical aid and compensation benefits from Texas Employers' in 1957.

Of course, the thousands who were *not* injured because of the intense safety efforts of TEIA and its policyholders would fill many Cotton Bowls.

But when accidents do occur, it's doubly gratifying to know that your insurance carrier has trained and experienced men in 25 Texas offices who have the desire to handle your claims fairly and promptly.

This service is one of the principal reasons why TEIA writes more workmen's compensation insurance in Texas than any other *five* companies combined. Why not put this service to work for you? Call your nearest Texas Employers' office today.

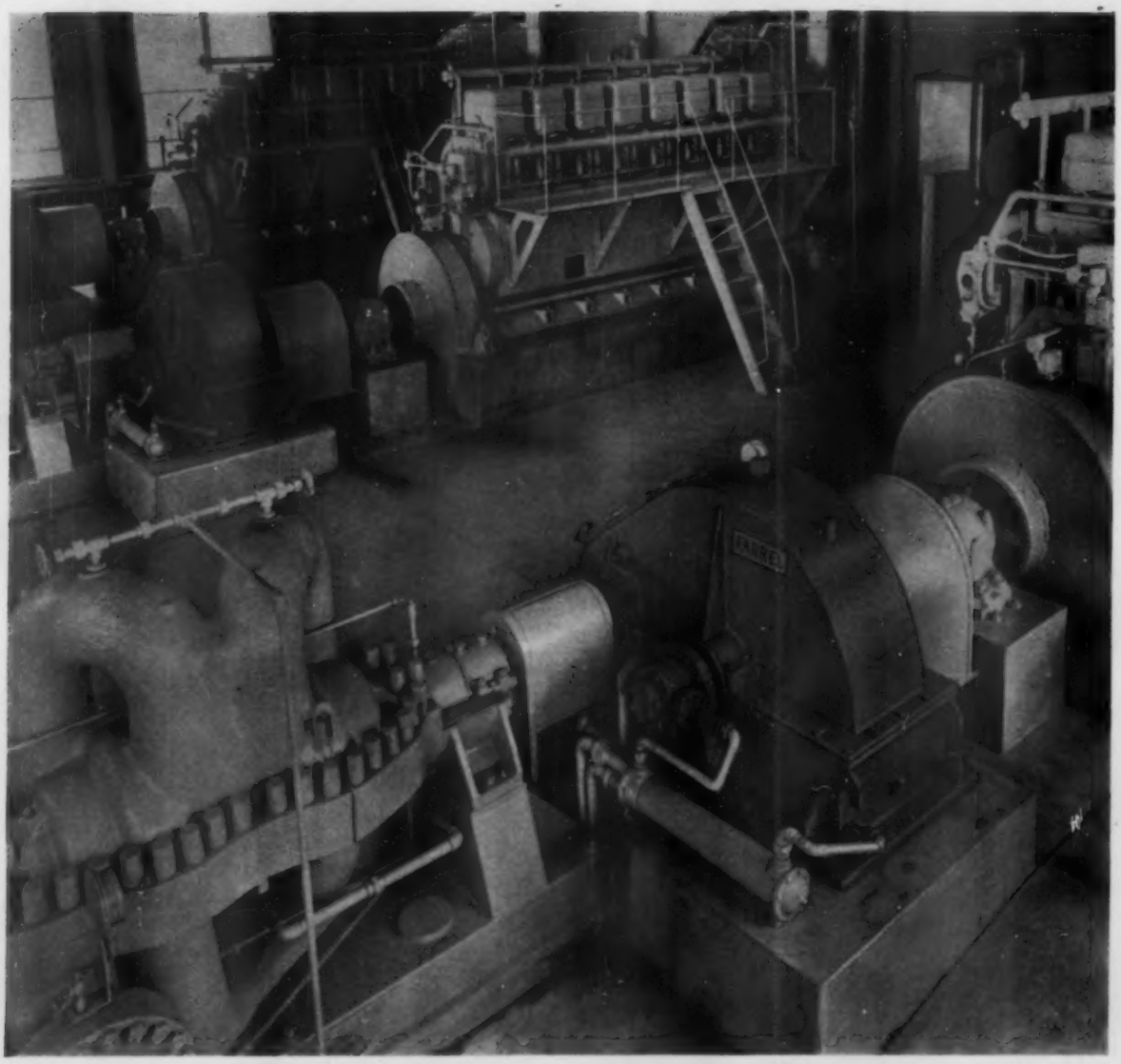
TEXAS EMPLOYERS
INSURANCE ASSOCIATION

HOME OFFICE:
EMPLOYERS INSURANCE BUILDING
DALLAS, TEXAS

AUSTIN F. ALLEN, *Chairman of the Board* BEN H. MITCHELL, *President*

SERVICE OFFICES

ABILENE • AMARILLO • AUSTIN
BEAUMONT • CORPUS CHRISTI
DALLAS • DALLAS (OAK CLIFF)
EL PASO • FORT WORTH
FREEPORT • GALVESTON
HARLINGEN • HOUSTON
LONGVIEW • LUBBOCK
MIDLAND • ODESSA • PORT
ARTHUR • SAN ANGELO • SAN
ANTONIO • SHERMAN • TYLER
WACO • WICHITA FALLS



SPEED INCREASERS UNATTENDED

at two full-satellite pipeline pumping stations

Two of the four pumping stations on Evangeline Products System's 16-inch pipeline from Port Arthur, Texas, to Baton Rouge, Louisiana, are each powered by three Nordberg 1700 HP Duafuel engines. These are full-satellite stations, and are attended only during daylight hours. All functions are controlled from the master station at Port Arthur.

The engines drive centrifugal pumps through Farrel gear units, which step up the speed from 500 to 2402 RPM. Farrel gear units have a pipeline history that makes them an ideal choice for a remotely controlled or unattended pumping station. Of the thousands of units installed, since they were first developed in 1932, *not one has ever been known to be replaced.* Even the first units built are still in service.

Send for full details of these long-lasting, trouble-free units. Ask for a copy of Bulletin 451.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Boston, Akron, Ann Arbor (Mich.), Chicago, Minneapolis, Los Angeles, Salt Lake City, Tulsa, Houston, Fayetteville (N. C.).
European Office: Piazza della Republica 32, Milano, Italy

FB-1152

Farrel-Birmingham®

DU PONT *Petroleum Chemicals* NEWS

Number 92 in a Series of Bulletins for the Petroleum Industry

NOVEMBER 1958

Progress report on "rumble" and "thud" studies

Five years ago, researchers in the Du Pont Petroleum Laboratory isolated a new phenomenon in the performance of high-compression ratio engines. They called it "rumble."

THE CHASSIS DYNAMOMETER setup at the Du Pont Petroleum Laboratory is helpful to Du Pont engineers in pinpointing the causes and effects of rumble and thud in high-compression ratio engines.

"Rumble," a low-pitched noise produced in engines of about 9.5:1 or higher compression ratio, is usually noticeable on hills or during accelerations above 40 or 50 miles per hour and when the throttle is wide, or nearly wide, open. Laboratory tests show that it is associated with a high rate of pressure rise within the cylinders of such engines, plus the presence of combustion chamber deposits.

Now—"Thud"

Another low-pitched noise has been noted in tests at the Du Pont Laboratory. It has been given the name "thud."

"Thud" takes place in the same types of high-compression ratio engines as "rumble," with one significant difference—it can occur in the absence of combustion chamber deposits.

FOA-2 makes costly tank cleaning unnecessary

Recently another case history of dollars saved through fuel oil improvement came to Du Pont: No. 6 residual fuel was being burned at a factory in upstate New York. This plant uses about 3 million gallons of fuel per year. It is first delivered to a 300,000-gallon storage tank and then transferred to a 17,000-gallon horizontal work tank.

Sludge build-up meant costly clean-outs

Sludge was playing havoc with the work tank, largely because the inlet and outlet connections were located at its head end, and sludge built up rapidly at the far end. When it reached a depth of several feet, it threatened to interfere with suction pipe operation. So every few months it was necessary to open the tank, and send a work crew inside to remove the accumulation manually. A "messy," time-consuming and costly job.

How FOA-2 solved the problem

Last February about 10-15 gallons of Du Pont Fuel Oil Additive No. 2 was poured into this tank, in the hope that it would stabilize the fuel and reduce sludging, thus extending the time between clean-outs. After the fuel in the tank had been consumed in the normal manner, it was quickly discovered that virtually no sludge remained. The additive had solubilized and dispersed the sludge, and stabilized the fuel. Therefore the plant promptly adopted a program of treating its fuel oil with FOA-2 to eliminate the costly clean-out operation.

If you or your customers are experiencing fuel oil sludging problems, let your Du Pont representative work out a solution for you.

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

OVER

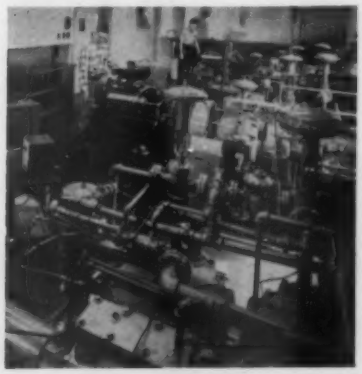
DUPONT *Petroleum Chemicals* NEWS

CONTINUED *"rumble and thud"*

Investigations of both rumble and thud are going on today, in engines in the Du Pont Petroleum Laboratory. Gasoline technology stands to benefit importantly from these tests, as it has in the past from Du Pont investigations of "knock" and "wild ping."

Through these and other studies of combustion phenomena, Du Pont automotive engineers have gained extensive working knowledge of the behavior of hydrocarbons. This helps Du Pont work with refiners in blending gasoline stocks for optimum performance and lowest manufacturing costs.

▲ **LABORATORY,** as well as on-the-road and dynamometer engine tests, are employed by Du Pont scientists in their studies to uncover every detail related to rumble and thud. ▼



Details available to you

Numerous papers have been presented by Du Pont technologists on the subjects of rumble, thud, knock and ping. Your Du Pont Petroleum Chemicals representative will gladly get copies for you.

YOU OUGHT TO KNOW...

E. HEARN SIMPSON, Sales Manager of Du Pont's Petroleum Chemicals Division, joined the company in 1930 in the Fabrics and Finishes Department. Two years later he was transferred to the Organic Chemicals Department and for a number of years he was a salesman of products as diverse as industrial alcohol, anti-freeze and gasoline antioxidants.

Five years were devoted to sales of the latter, in both the Mid-Continent and Gulf Coast regions.

Hearn Simpson's career at Du Pont was interrupted for three years while he served as a naval officer on aircraft carriers in the Pacific theater of operations.

On his return to Du Pont in 1946, Mr. Simpson was made sales manager of alcohol and camphor. He was elevated to his present position in 1950.

Mr. Simpson attended Colorado University and was graduated from the University of Denver with a Bachelor of Science degree.

Nylon cord tires a step toward highway safety

On today's turnpikes and thruways, four tire hazards are becoming increasingly serious. Tires with nylon cord are a long step toward eliminating them all.

Heat is the biggest threat. Sustained speeds of 60 or more miles per hour are not unusual on many of our superhighways. Nylon resists the effects of heat, reducing the chances of tire failure at these critical speeds.

The particular problem with heat is that it has a way of bringing out the worst in a tire, of finding and preying upon all the defects that may have come about through bruising, moisture and flex fatigue, the other three tire hazards.

Nylon corded tires have high resistance to heat.

Tough nylon safely withstands violent twists, bends and flexing without damage to the tire. And the chemical nature of nylon is such that moisture doesn't harm it.

As America's superhighway program moves forward, the demand for safe, reliable protection will result in the increased use of tires corded with nylon, another petrochemical product made possible by the cooperation of the petroleum and chemical industries.

SALES OFFICES

Chicago 3—8 So. Michigan Ave. ... RAndolph 6-8630
Cleveland 15—101 Prospect Ave. ..... MAin 1-3422
Houston 2—705 Bank of Commerce Bldg. ..... CApitol 5-1151
Los Angeles 17—612 So. Flower St. . MAdison 4-1354
New York 20—45 Rockefeller Plaza ..... COlumbus 5-2342
Philadelphia 2—3 Penn Center Plaza . . LOcust 8-3531
Pittsburgh 22—1 Gateway Center . . . ATlantic 1-2933
San Francisco 4—111 Sutter St. . . . . EXbrook 2-1934
Seattle 3—4003 Aurora Ave. ..... MElrose 2-6977
Tulsa 1—1811 So. Baltimore Ave. . . . . LUther 5-5578
In Canada—Du Pont Company of Canada (1956) Limited, Petroleum Chemicals, 85 Eglinton Ave. East, **Toronto 12**—Ontario ..... HUdson 1-6461
In Other Countries—Organic Chemicals Department, Export Division, 7447 Nemours Bldg., Wilmington 98, Del., PRospect 4-2962.

DU PONT
REG. U.S. PAT. OFF.

Better Things for Better Living
... through Chemistry

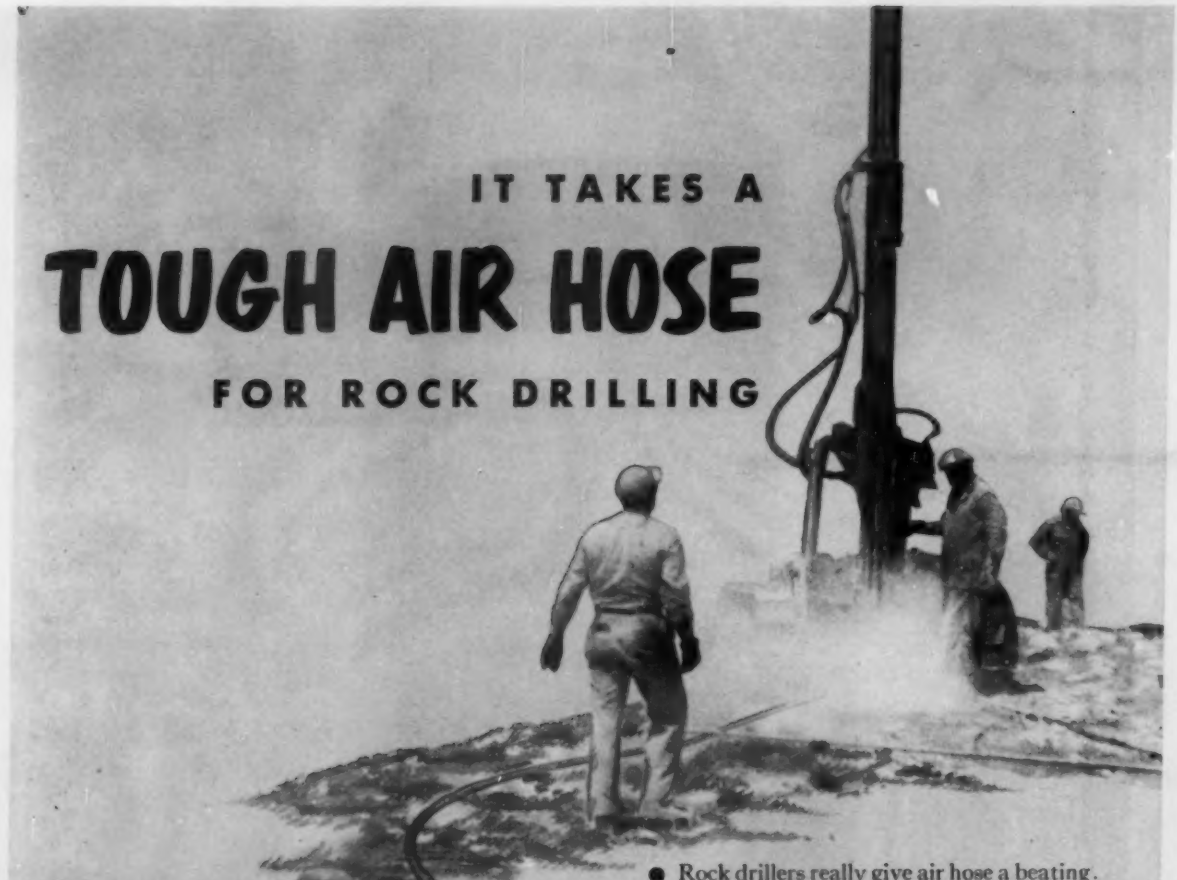
Du Pont Tetraethyl Lead and other Petroleum Additives

OVER

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

A-8064

Printed in U. S. A.



IT TAKES A TOUGH AIR HOSE FOR ROCK DRILLING

● Rock drillers really give air hose a beating.

They pull the compressor with the hose . . . they drag the hose over razor-sharp rocks . . . they twist it . . . whip it . . . jerk it. And still the hose must deliver a large volume of air without kinking and without failure.

To stand up in rock drilling service, an air hose really has to be able to "take it".

WIRETEX can!

Case history—On a rock drilling job in Tulsa, Oklahoma recently, a competitive hose failed in a matter of hours . . . WIRETEX was installed . . . WIRETEX finished the job . . . WIRETEX is still performing like a champion and will continue to for a long time to come.

This is just one more application where WIRETEX, made by Republic Rubber, is your best buy. WIRETEX is available from stocking distributors in all parts of the country.

Stocked in the Mid-Continent Area by JONES & LAUGHLIN STEEL CORPORATION, Supply Division P.O. Drawer 2481, Tulsa 2, Okla. and the J & L Store in YOUR field.

REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN 1, OHIO

INDUSTRIAL RUBBER PRODUCTS

Stocked on the West Coast by HENDRIE BELTING & RUBBER CO. 406 Towne Ave., Los Angeles, Calif. PACIFIC COAST RUBBER COMPANY 51 Main St., San Francisco, Calif.

Mr. BIG

DESIGNED
FABRICATED
ERECTED BY

HAMMOND IRON WORKS

FOR THE

CITY of TULSA

as far as is known . . .

THIS IS THE LARGEST STEEL TANK IN THE WORLD

CAPACITY 357,000 BARRELS

DIAMETER 285'

HEIGHT 32'

Russell W. Hall
Supt. of Construction & Maintenance
Tulsa City Water & Sewer Dept.

•

W. R. Holway and Associates
Consulting Engineers

HAMMOND IRON WORKS

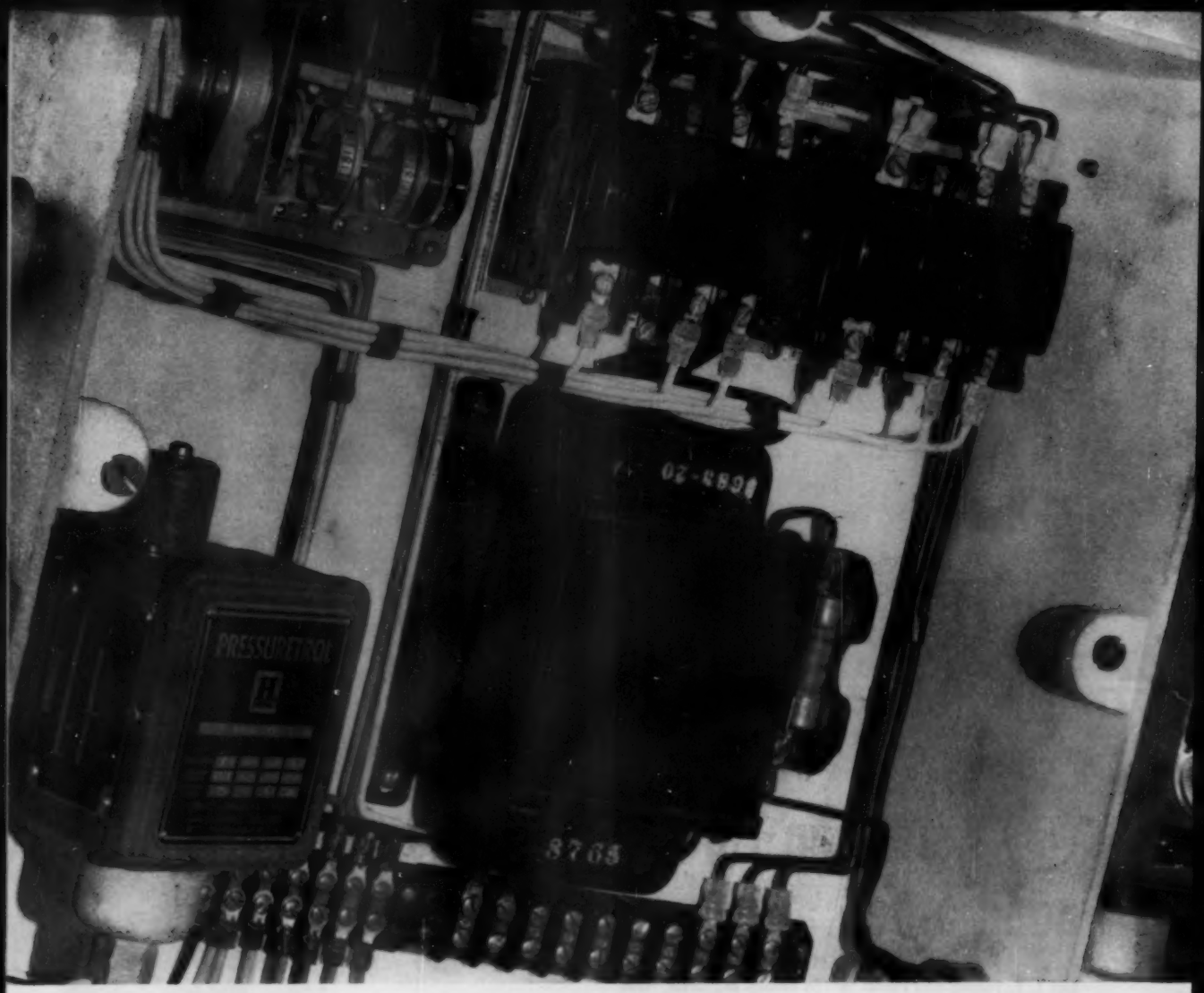
HAMONDTANK

Sales Offices

744 BROAD STREET, NEWARK 2, N. J.

Offices and Plants

WARREN, BRISTOL and PITTSBURGH, PA.
PROVO, UTAH • CASPER, WYO. • BIRMINGHAM, ALA.



For "set it and forget it" gas drying—

Come to Kemp

Kemp Dryer protects instrument lines at −25° for Quaker State's Farmer's Valley, Pa. plant. Fully automatic operation saves time and manpower, yet provides dependable service on a 24 hour basis.

Here's the nerve center of every Kemp Fully Automatic Gas Drying Unit. Drying process gasses and inerts . . . air for pneumatic instruments and tools . . . liquids . . . for pressurizing anhydrous liquids . . . this panel controls the Kemp Dryer surely and safely. Once timed to meet your program, it provides efficient drying on a continuous basis, without worry or excessive maintenance.

Note the precision with which even the wiring is connected. It's typical of the thorough workmanship going into every component of the Kemp Dryer. Kemp Dryers are built with care; built to last and perform year after year with dependability resulting from a quarter century's experience.

Whether your operation calls for a completely automatic Kemp Dryer, a semi-automatic model, or a simple, manually operated unit, there's a model and capacity to meet your needs. Kemp Field Engineers will gladly study your problem and make complete recommendations, even down to the proper desiccant (we select from over 20) to do your job best.

Call in your Kemp Representative when you plan a new installation or wish to up-date an old one. He'll give you full information. Or write direct and ask for Bulletin D-102: THE C. M. KEMP MFG. CO., 405 E. Oliver Street, Baltimore 2, Maryland.

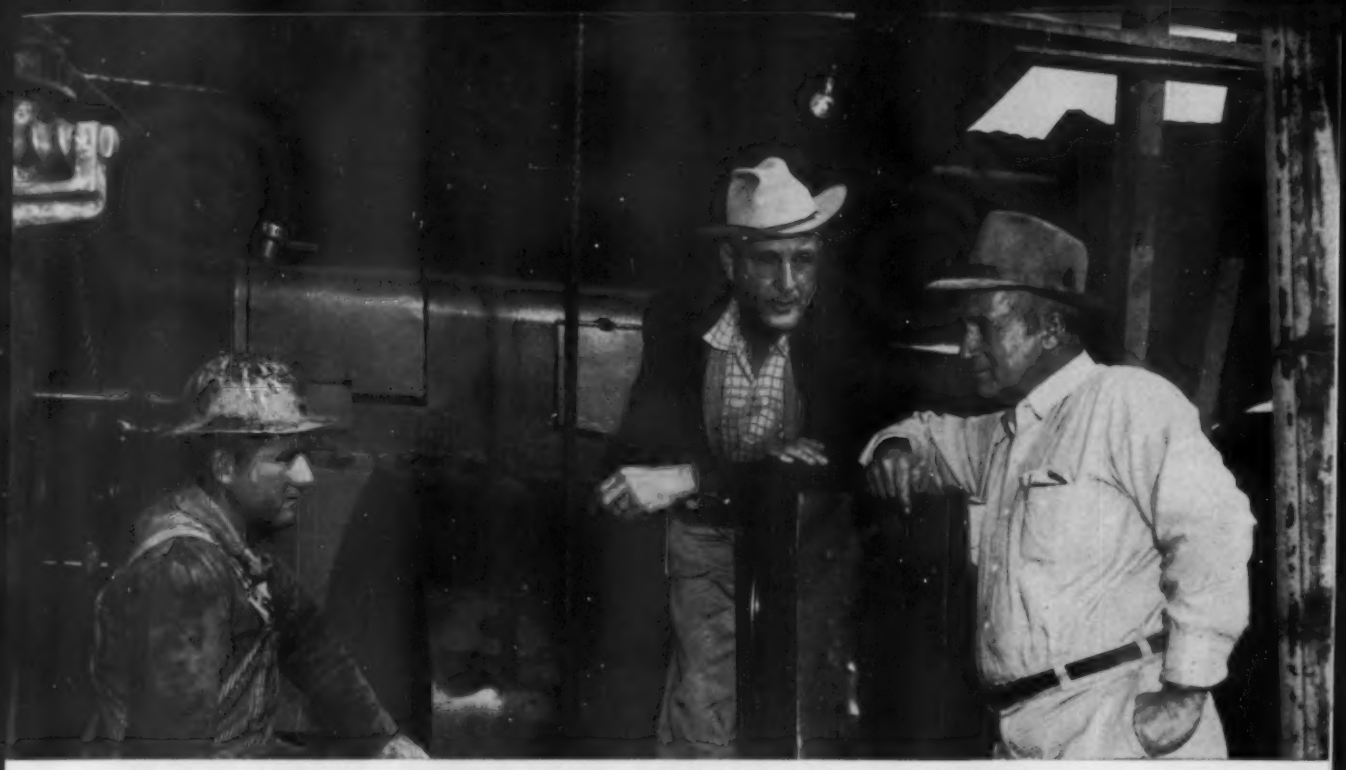
Convection Dryers

Inert Gas Generators

KEMP OF BALTIMORE

Nitrogen Generators

Oriad Dryers



No signs of wear. Inspection of Tiger Brand Rope after drilling an 8600-foot well showed it to be in excellent condition with plenty of lubrication left.

"USS American Tiger Brand is as good a line as a man can find"

Says L. E. Fannin, Tool Pusher for Trio Drilling Co., Dallas, Texas

THE TRIO DRILLING CO. has four rigs—and they are all equipped with USS American Tiger Brand Wire Rope.

The tool pusher, Mr. L. E. Fannin, keeps accurate service records of each rope and checks the wear regularly. He says, "American Tiger Brand Wire Rope is hard to beat. It's as good a line as a man can find. That's why we use it on all our rigs."

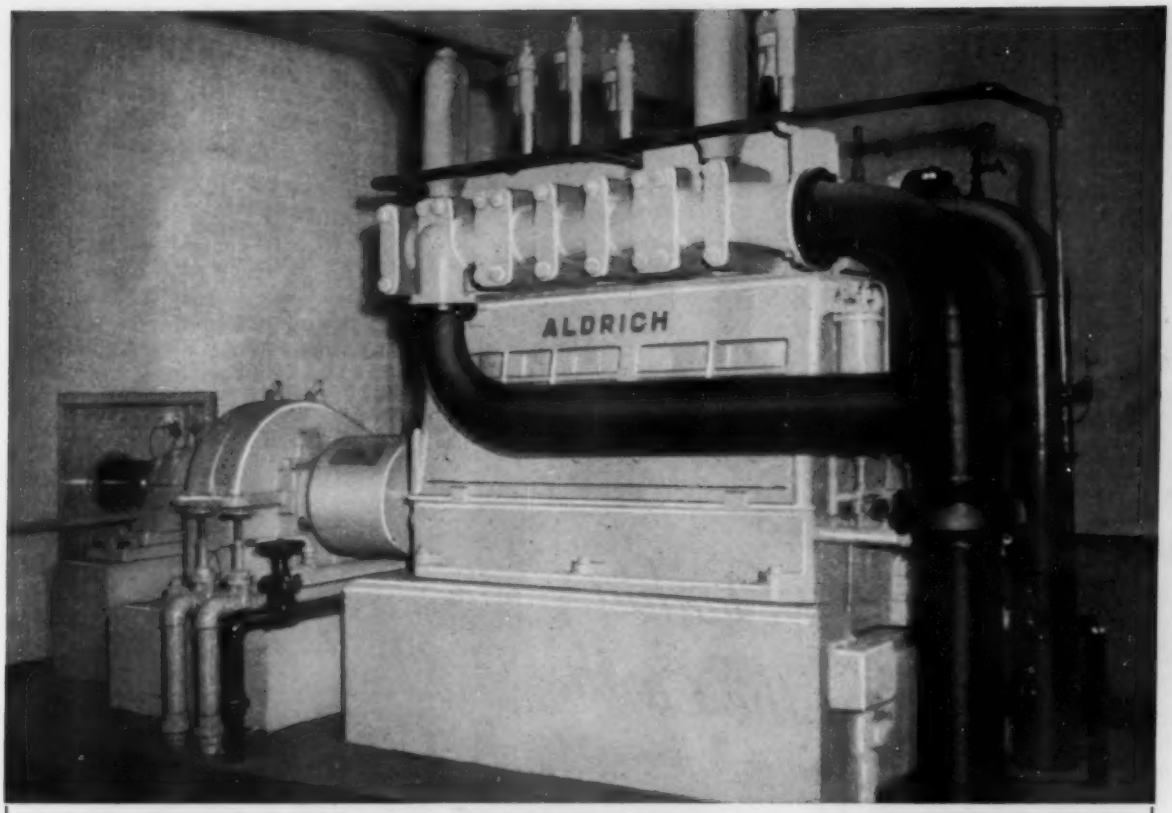
This rig was strung with 1750 feet of 1⅛" 6 x 19 Tiger Brand Excellay Preformed Monitor with an Independent Wire Rope Core. Drilling Contractors all over the oil fields have found that this rope gives them the best service at least cost. It has a high tensile strength combined with an ability to resist heavy abrasive wear.

Why Tiger Brand gives you more for the money. With every Tiger Brand Wire Rope you get the results of years of basic research in steel making plus the application engineering of American Steel and Wire. What's more, the rope is produced under a rigid system of quality controls with plant facilities unsurpassed in the industry. These are the hidden elements that assure long service life and low wire rope costs. For more information, write to American Steel & Wire, Rockefeller Building, Cleveland 13, Ohio, or contact your local distributor.

USS is a registered trademark

American Steel & Wire Division of **USS United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • United States Steel Export Company, Distributors Abroad



FIELD REPORT

APPLICATION: Pipeline Service

South Saskatchewan Pipe Line Company, Cantuar, Saskatchewan.

PUMPS: 3 Aldrich Quintuplex,

4½" plungers, 6" stroke. Each having a capacity of 20,000 b/d at 300 RPM, 1200 pounds pressure.

OPERATION STARTED: December, 1955

EXPERIENCE TO DATE:

Units pump viscous crude oil over 158 miles of 16" main line pipe. Customer reports exceptionally fine field service with routine maintenance only.

Field parts stock available in Carmi, Ill.; Charleston, W. Va.; Casper, Wyo.; Houston; Los Angeles; Odessa and Tulsa. For further information, write the Aldrich Pump Company, 3 Gordon Street, Allentown, Pa.

the toughest pumping problems go to ALDRICH

BLUE FLAG®

PIPELINE REINFORCING WRAP

Finest Quality Under the Earth

uniform porosity allows enamel to bleed through quickly, gases to escape

increases enamel's resistance to cracking and backfill damage

special glass resists water and soil chemicals to help fight corrosion.

high tensile strength virtually eliminates breakage in the field.

L·O·F GLASS FIBERS

For full details on complete pipeline protection, write to: *Dept. 78-118, 1810 Madison Ave.*

L·O·F GLASS FIBERS COMPANY

TOLEDO 1, OHIO

The Arithmetic of Materials Handling

Fuller pneumatically conveys drilling mud directly into oil rig bins, from specially-fitted Bourg Mud & Chemical Co. supply ship. Ship carries 250 tons of mud, delivers at a rate of 50 tons an hour.

Sea-Going Fuller Pneumatic Conveying System Cuts Time and Cost of Vital Drilling-Mud Deliveries

The Bourg Mud & Chemical Co., Inc., of Lockport, La., is making off-shore deliveries of drilling mud by advanced Fuller pneumatic systems.

The dry mud is automatically pumped aboard oil rigs from a Fuller equipped cargo ship at a rate of 50 tons an hour—one man replacing large crews handling 100-pound sacks in cargo nets. Previously, bag handling in high seas had been either dangerous or impossible. The highly flexible bulk-handling system now operates safely and efficiently at all times.

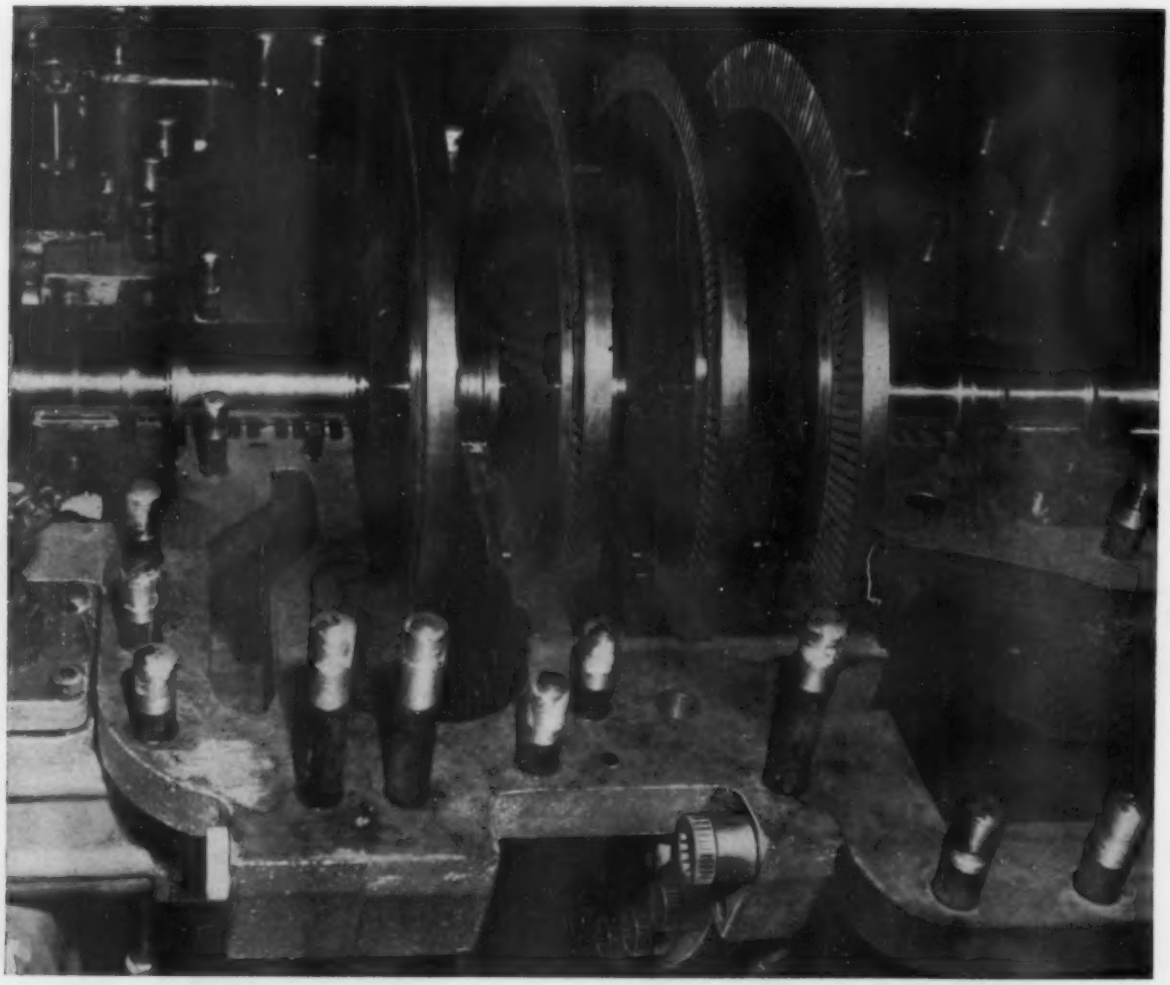
Self-emptying hoppers designed and built by Delta Tank Manufacturing Company installed into the Bourg ship are fitted with F-H Airslide® fluidizing gravity conveyors. A 6-inch Fuller-Kinyon pump transfers the aerated material to bins aboard the rig — over distances up to 300 feet. Air pressure is supplied by a diesel-driven Fuller single-stage vane-type rotary compressor.

Here is a good example of Fuller's engineering experience and wide range of equipment combining to solve your materials handling problem. If you handle large volumes of cement and barite, why not investigate a simple, efficient Fuller pneumatic conveying system? For details, write or call Fuller today outlining your problem.

1311
P-171

FULLER COMPANY
132 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • New York • San Francisco
Seattle

Fuller
....pioneers in harnessing AIR



THE INSIDE STORY OF A MURRAY HIGH SPEED COMPRESSOR

DRIVE TURBINE REVEALS THE REASONS FOR MURRAY'S UNIVERSAL ACCEPTANCE

A look at MURRAY'S rugged construction from the inside shows the husky shaft and heavy accurately formed discs with generous sized hubs designed to withstand the axial and radial stresses imposed by this type of service.

Large-dimension disc rims receive the specially contoured stainless steel blades with the Murray integral shroud. This insures smooth steam passages with maximum strength.

Short bearing spans insure smooth operation and eliminate the hazard of operating in critical speeds.

A look at the heavy flanges and husky bolting in the actual unretouched shop photo shown above bears out the extreme ruggedness that typifies every feature of Murray construction.

Our nearest representative will gladly help you solve your high speed compressor drive turbine requirements. Just write to Murray Iron Works Company, Burlington, Iowa, for his name.

Murray
TURBINES

MURRAY IRON WORKS COMPANY • BURLINGTON, IOWA
Builders of Steam Power Equipment for Nearly a Century

New kind of offshore project is served by Sikorsky helicopters

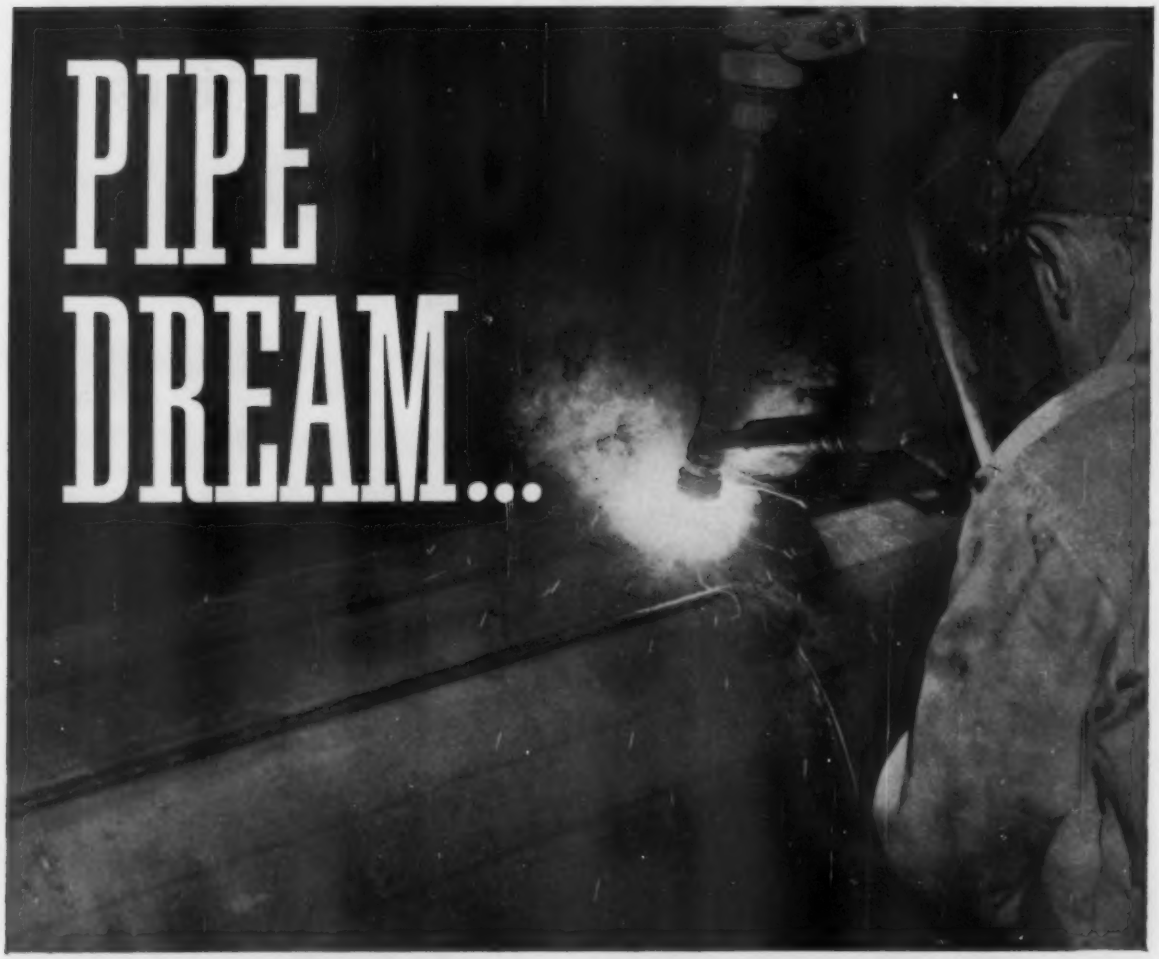
STEEL ISLAND will stretch for nearly a mile in the Gulf, 7 miles off Grand Isle, Louisiana, supporting world's first offshore sulphur mining plant. Sikorsky helicopters furnish quick, dependable transportation from supply points on shore.

In the Gulf of Mexico off Louisiana, a 15-tower steel island is being built to accommodate the world's first offshore sulphur mining plant. A project of Freeport Sulphur Company, the structure will stretch for nearly a mile. It includes heavy and complex mining facilities, living quarters for 250 men . . . and, of course, a heliport.

As with so many important projects involving the discovery or development of natural resources, helicopters are flying men and cargo between the operating location and its supply points. Naturally, the helicopters are Sikorskys.

Only Sikorskys have furnished heavy-payload helicopter transportation to the oil industry on regular schedules to offshore rigs and to sites in jungles and other inaccessible areas. If transportation is a problem where you want to operate, Sikorsky helicopters may provide an answer. Write for information.

SIKORSKY AIRCRAFT
STRATFORD, CONNECTICUT
One of the Divisions of United Aircraft Corporation



...UNIONARC Welding saves $7000 on one production run

UNIONARC Welding—LINDE's new electric welding method for steel—increased production by 300% and saved a western pipe mill $7000 on a single run of steel pipe. Replacing covered electrode methods, UNIONARC Welding is expected to save this company $150,000 a year.

UNIONARC Welding uses a continuously-fed wire electrode, magnetically coated with flux and shielded with carbon dioxide gas. It has three times the speed and weld penetration of covered electrode welding. And UNIONARC Welding gives you "finished", X-ray quality welds and low hydrogen deposits—in all welding positions.

See for yourself—ask your nearest LINDE representative to *prove* that UNIONARC Welding slashes time and labor costs over conventional methods. Call your local LINDE office today! Or write Box 0113, LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. In Canada: Linde Company, Division of Union Carbide Canada Limited.

Linde TRADE-MARK

UNION CARBIDE

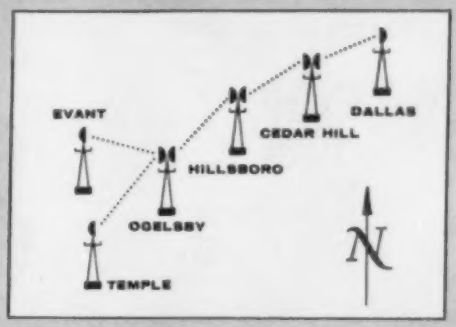
"Linde", "Unionarc", and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

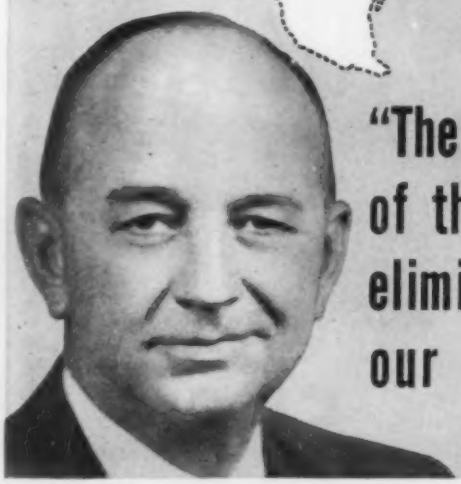
Now Shell offers <u>two</u> packages to boost octane

Either process removes mercaptans almost completely at a cost of only a fraction of a cent per gallon. You save enough in TEL to pay this sweetening cost several times over. The same TEL dosage goes farther—gives you extra octanes cheaper than any other way. Both processes are now available for license. To find out which process is best for your operation, write Shell Development Company, 50 West 50th Street, New York 20, New York.

SHELL DEVELOPMENT COMPANY

MORE THAN A MILLION CHANNEL MILES OF RCA MICROWAVE SYSTEMS NOW IN SERVICE





"The new RCA Microwave System of the Atlantic Pipeline Company eliminates a major bottleneck in our pipeline communications!"

M. S. Collett, *Manager Communications*
Atlantic Refining Company

"It has allowed us to virtually double our communications system to a total of 8300 channel miles, through use of additional carrier channels or wireline facilities, which are tied into the microwave system, and has provided the cornerstone for future microwave expansion to include telemetering, facsimile, and VHF radio control."

Present route requires only six stations, but can be expanded, as needed, along the pipeline right-of-way either to West or East. The RCA CW-20A microwave system is 171 miles in length and interconnects with approx. 1900 miles of existing wireline. The microwave system connects Atlantic's Dallas office with pump stations at Temple and Evant, Texas. Initially it will provide 13 voice channels into Dallas, designed for expansion up to 46 channels. It will improve the over-all reliability of Atlantic's communications network by eliminating major outages due to weather and man-made damage.

Dispatchers controlling vast Atlantic pipeline network at Dallas, Texas.

Tank farm at Midland, Texas part of the extensive pipeline system.

The baseband amplifier in this RCA system provides a broad band from 300 cycles to 500,000 cycles on which multiplexed circuits are placed. Channels may be interchanged simply by switching plug-in crystals. Channel units have the high stability required for frequency-shift telegraphy, telemetering, and facsimile. Multiplex circuits employ standard single sideband, suppressed carrier technique long accepted for efficient utilization of spectrum space. For further particulars on use of microwave in utilities, pipelines, turnpike and other applications . . .

Get the help of RCA Specialists—write to
RCA Dept. MC-39, Building 15-1, Camden, N. J.

RADIO CORPORATION of AMERICA

COMMUNICATIONS PRODUCTS

CAMDEN, N. J.

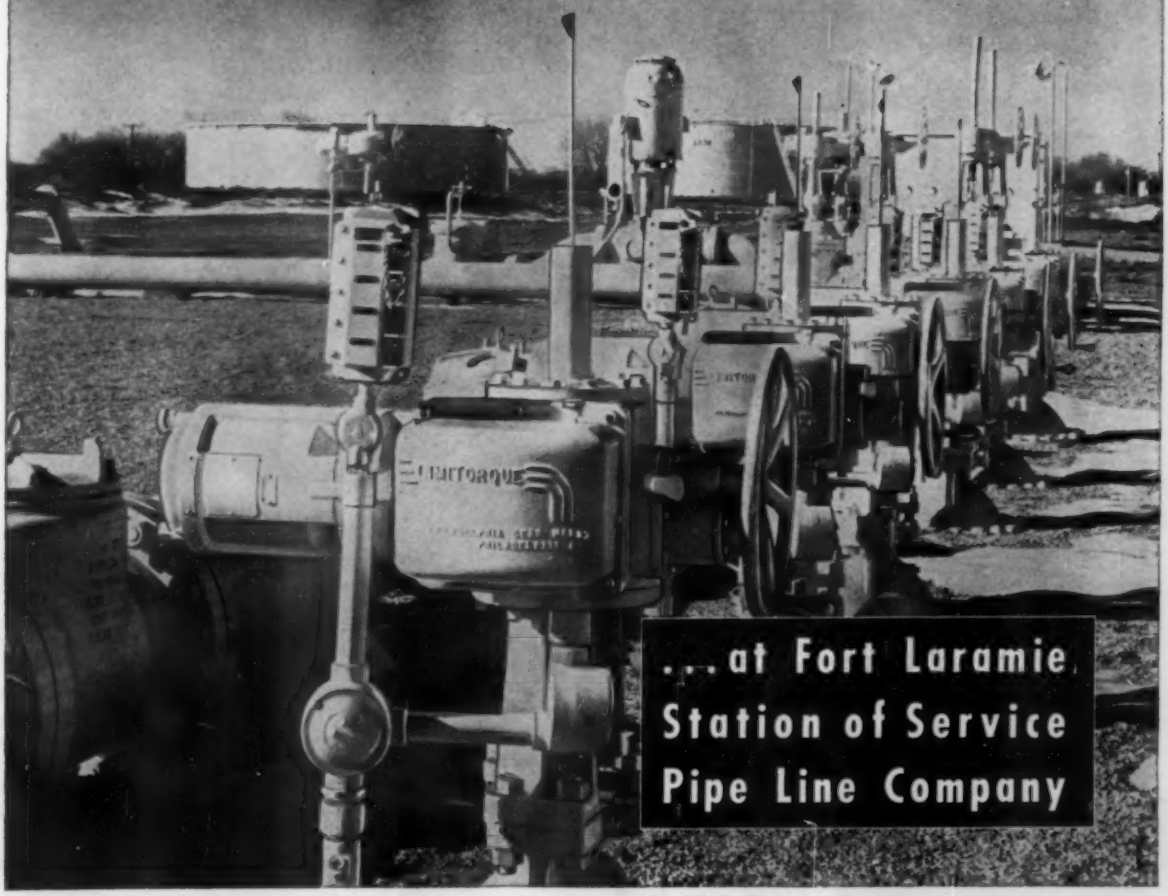
In Canada: RCA VICTOR Company Limited, Montreal

Tmk(s) ®

On Suction and Discharge Valves to Pumping Units

LimiTorque

VALVE OPERATORS ARE USED...



LimiTorque is by far the most widely used automatic valve operator—thousands are operating day and night on Pipe Lines and in Refineries throughout the world. The wide preference for LimiTorque stems from previous performance under all service and climatic conditions: heat, cold, dust, fumes, sleet, snow and rain.

There is no guess work or labor connected with LimiTorque Valve Controls—one key man can open and close any type of valve, quickly and dependably in remote or hazardous locations; thus pipe line and refinery operation procedure can be handled easily and safely.

LimiTorque may be actuated by any available power source, such as Electricity, Oil, Gas, Water or Air; and is available for Micro-wave control.

LimiTorque Controls can be field-mounted on existing valves . . . contact your valve manufacturer or nearest LimiTorque sales-engineering office.

Send for catalog L-550—and please use your Business Letterhead when requesting a copy.

THERE IS NO SUBSTITUTE FOR —

LimiTorque®

PHILADELPHIA GEAR CORPORATION

ERIE AVE. & G STREET, PHILADELPHIA 34, PENNA.

Offices in all Principal Cities

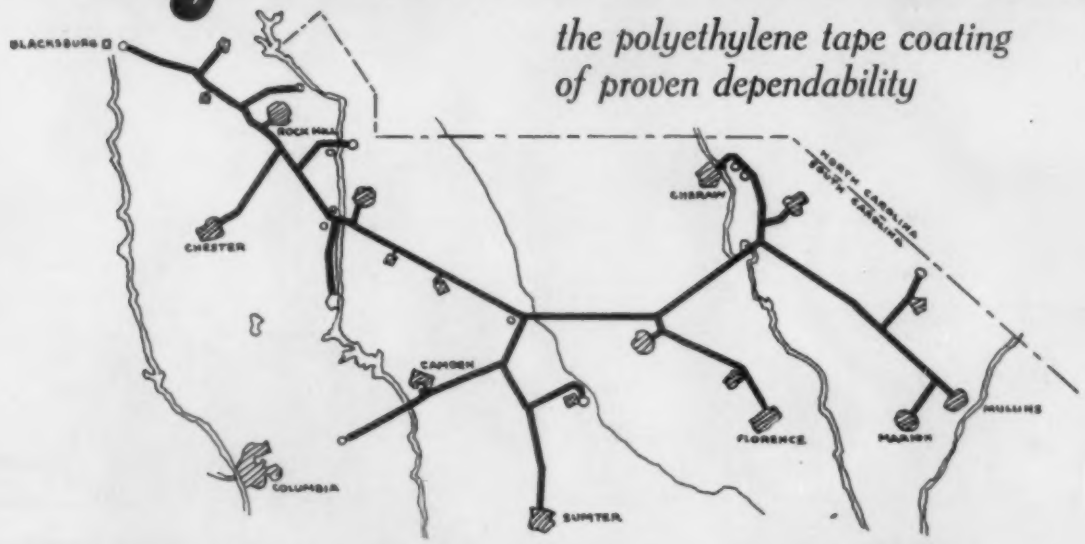
INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID AGITATORS • FLEXIBLE COUPLINGS

Limitorque Corporation • Philadelphia

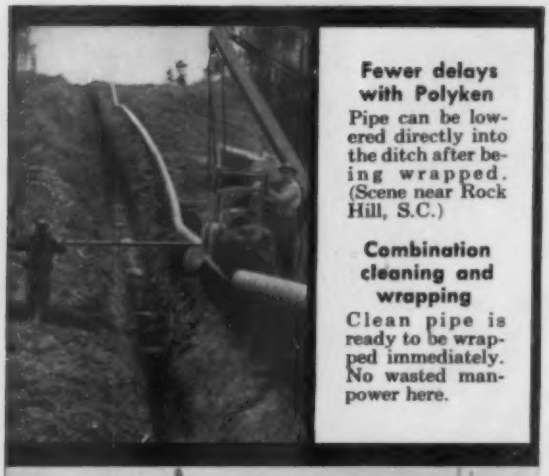
New Carolina pipeline uses

Polyken Protection

the polyethylene tape coating of proven dependability



The contractors—Panama Williams Corporation and Buchanan Contracting Company used Polyken Tape for its construction savings in time, labor and handling costs.



Fewer delays with Polyken
Pipe can be lowered directly into the ditch after being wrapped. (Scene near Rock Hill, S.C.)

Combination cleaning and wrapping
Clean pipe is ready to be wrapped immediately. No wasted manpower here.

The Carolina pipeline system—serving ¼ of the entire state of South Carolina—will bring natural gas to one of the most important industrial regions of the South.

Polyken polyethylene tape was chosen as the coating for this system because it's proven.

Pipeline operators have seen how polyethylene stands up to the corrosive combination of moisture, soil chemicals and electrolytic current.

And contractors have found that The Polyken Method provides cost-cutting advantages like these:

1. **Substantial labor and equipment savings because of simplified operation.**
2. **Faster construction—consistent high daily output.**
3. **No hot dope preparation—tape is always ready.**
4. **No drying or cooling time. Simple clean-wrap-and-lower operation makes for a tight spread and closer supervision.**
5. **Vastly reduced warehousing, shipping, handling costs.**
6. **Liabilities virtually eliminated—no fumes, no burns, no need to worry about human and livestock hazards.**
7. **Wrap goes into ground in factory-uniform condition.**

If you would like to know more about this time-saving, time-tested coating, contact Polyken Sales Division, Dept. OG7, 309 W. Jackson Blvd., Chicago 6, Ill.

Polyken®

Experienced in modern PROTECTIVE COATING

THE KENDALL COMPANY
Polyken Sales Division

POWELL

world's largest family of valves*

Fig. 1793 — Large Iron Body Bronze Mounted Gate Valve for 125 W. S. P. Outside screw rising stem and yoke, solid wedge disc. 8" and larger valves can be supplied with split wedge disc. Also available in all iron.

Fig. 559 — Large High Test Iron Body Bronze Mounted Swing Check Valve for 125 W. S. P. Heavily bolted iron cap. Renewable bronze seat rings, discs or disc facing, disc hinges. Can be used in horizontal or vertical position. All iron valves also available.

Fig. 1503 — Steel Gate Valve for 150 pounds. Outside screw rising stem. Heavily bolted bonnet and yoke. Precision fitted, accurately guided solid wedge disc. Valves with welding ends can also be supplied.

Fig. 1460 — "Master Pilot" Gate Valve for 150 W. S. P. Iron body bronze mounted. Bolted flanged bonnet with inside screw rising stem, solid wedge disc. Can also be furnished with flanged ends, and in all iron.

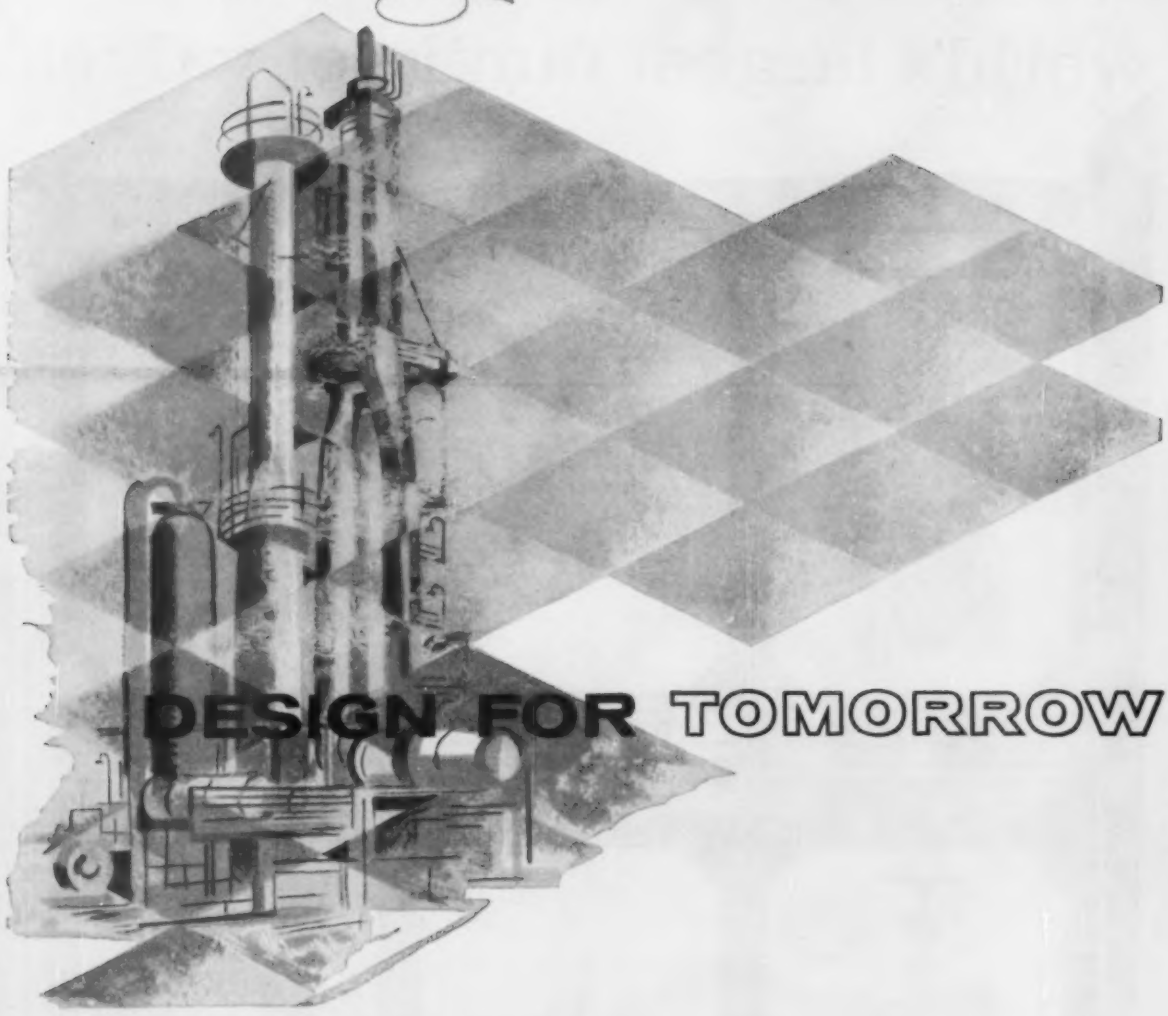
Fig. 8150 — Bronze L. P. Gas Globe Valve for 400 W. O. G. Union bonnet, inside screw rising stem, special composition disc, integral seat. Listed by Underwriters' Laboratories, Inc. Angle, Gate, Lift Check and Steel Valves available.

Fig. 1559 — Steel Lubricated Plug Valve for 200 pounds W. O. G.—A. S. A. 150 pounds. Screwed gland type. Single gland and bolted gland types can also be furnished. Large Valves—6" and above, can be supplied with gears for gear operation.

*and in this family there's a valve for every flow control requirement—for handling water, oil, gas, air, steam and corrosive fluids—available in the most required sizes and types. If your local distributor can't supply you, or if you need specially engineered valves for unusual conditions, write

THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**

intangibles were never so **important**



DESIGN FOR TOMORROW

The time is past when a petroleum, chemical or petrochemical plant could be built to meet immediate needs. In this fast-moving field it must be designed and built with an eye to tomorrow.

Flexible interpretation of plant design and broad experience in building for the future are important intangibles included in Procon service. That is why a Procon-built plant performs well today and yet can be readily adapted to the changing demands of tomorrow.

PROCON®

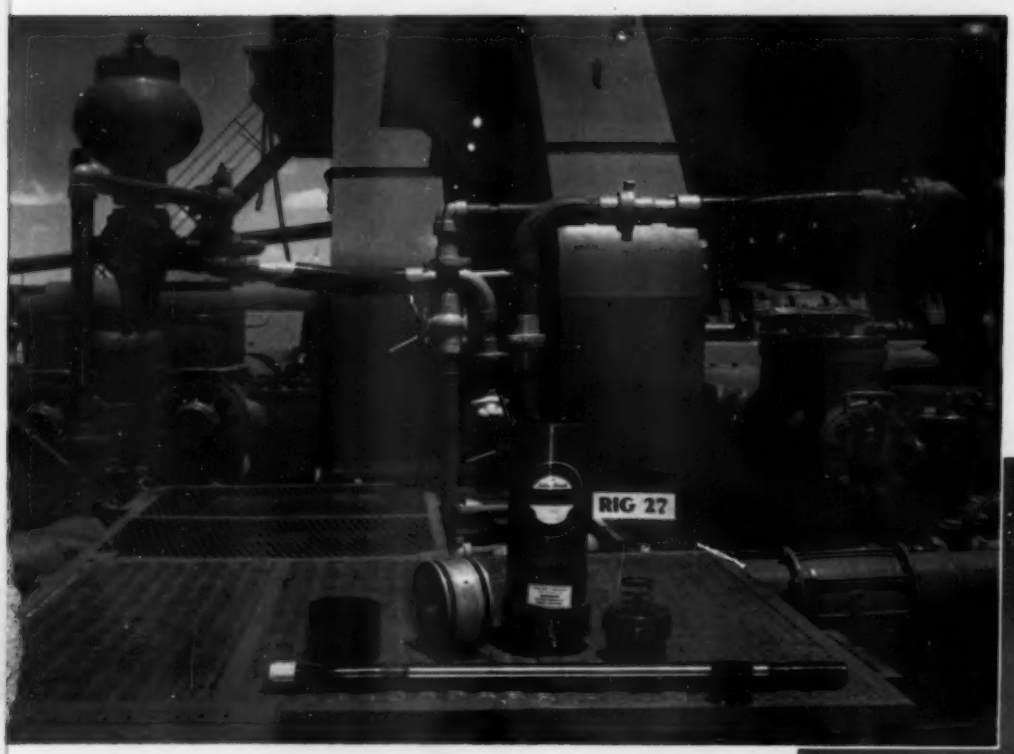
PROCON *Incorporated*

1111 MT. PROSPECT ROAD, DES PLAINES, ILLINOIS, U.S.A.

PROCON (CANADA) LIMITED, TORONTO 18, ONTARIO, CANADA
PROCON (GREAT BRITAIN) LIMITED, LONDON, W. C. 2, ENGLAND
PROCON INTERNATIONAL S. A., SANTIAGO DE CUBA

WORLD-WIDE CONSTRUCTION FOR THE PETROLEUM, PETROCHEMICAL, AND CHEMICAL INDUSTRIES

How MISSION pump parts helped "drill" the world's deepest well before it was even spudded!



Long before the Phillips Petroleum Company's 1-EE University started drilling, Mission research engineers had already designed and tested, in Mission's own mud pump laboratory, the vital pump parts that helped carry this well to its new world's record.

Under simulated extreme conditions that could be anticipated in drilling to 25,000 feet, the Mission Rods, Liners, Valves, Pistons, Liner and Gland Packings that figured in this remarkable drilling achievement passed all tests like the champions they are.

The drilling of the Phillips Petroleum Company's 1-EE University is not only a tribute to the pioneering spirit of the Phillips Petroleum Company, it emphasizes again the foresight and ingenuity of the oil tool manufacturers and technical services fraternity who are partners in petroleum progress.

Phillips Petroleum Company's 1-EE University in Pecos County, Texas.

Nothing but the finest will bear the name of **MISSION** MANUFACTURING CO.

PESA

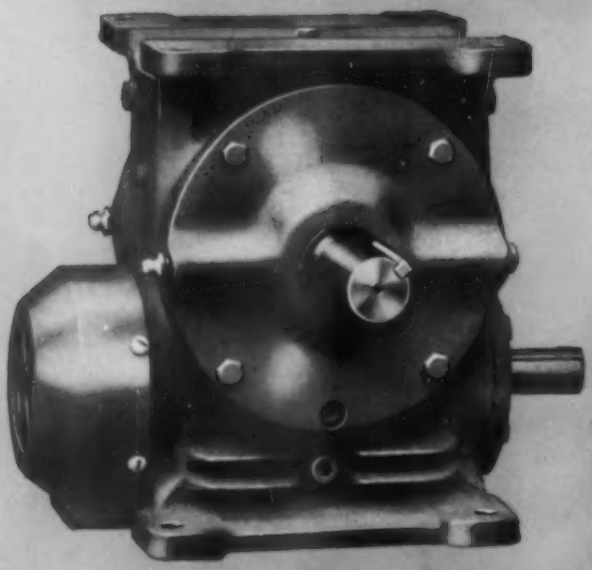
MISSION MANUFACTURING CO., P. O. Box 4209, Houston, Texas • Cable Address—"Missco" • Export Office: 30 Rockefeller Plaza, New York
In The United Kingdom: MISSION MANUFACTURING CO., LTD., 17 Hanover Square, London, W. 1 England • Cable Address—"Missoman"

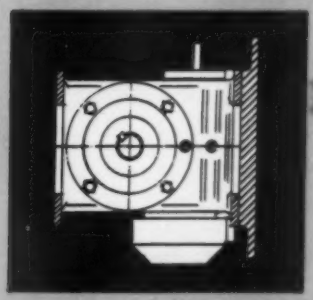
PISTONS • PISTON RODS • SLIPS • GLAND PACKINGS • LINERS • LINER PACKING
PUMP VALVES AND SEATS • SWABS • VALVES • HAMMERDRILS • CENTRIFUGAL PUMPS

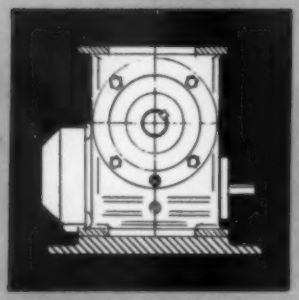
DE LAVAL

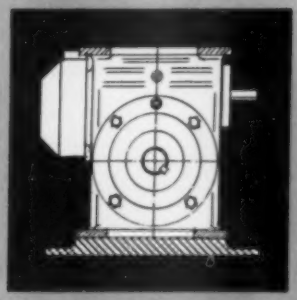
VERSO WORM GEAR SPEED REDUCERS

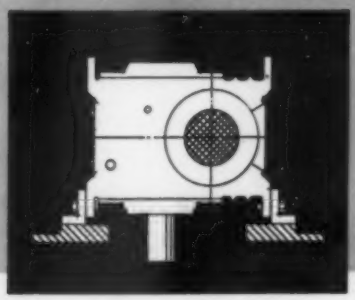
adapt to any mounting requirement

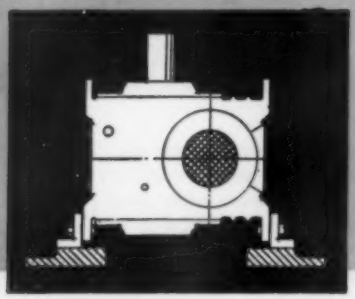


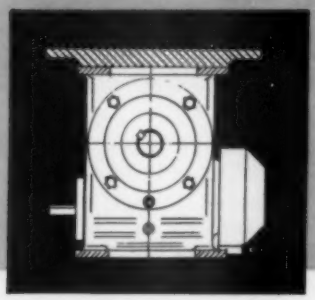












More Horsepower per Dollar

- *Fan cooled*
- *Involute helicoid thread form has heaviest load capacity of any type of worm gear*
- *Sturdy cast iron case and tapered roller bearings ensure maximum load capacity*
- *Gear shafts are heat treated alloy steel*
- *Worm and worm shaft is a single piece of nickel alloy steel*
- *Gear is made from centrifugally cast bronze*
- *Finest American craftsmanship*

Now De Laval offers you a complete new line of versatile worm gear speed reducers. These reducers are designed for heavy duty industrial work and continuous running under demanding service. The units may be mounted in any position.

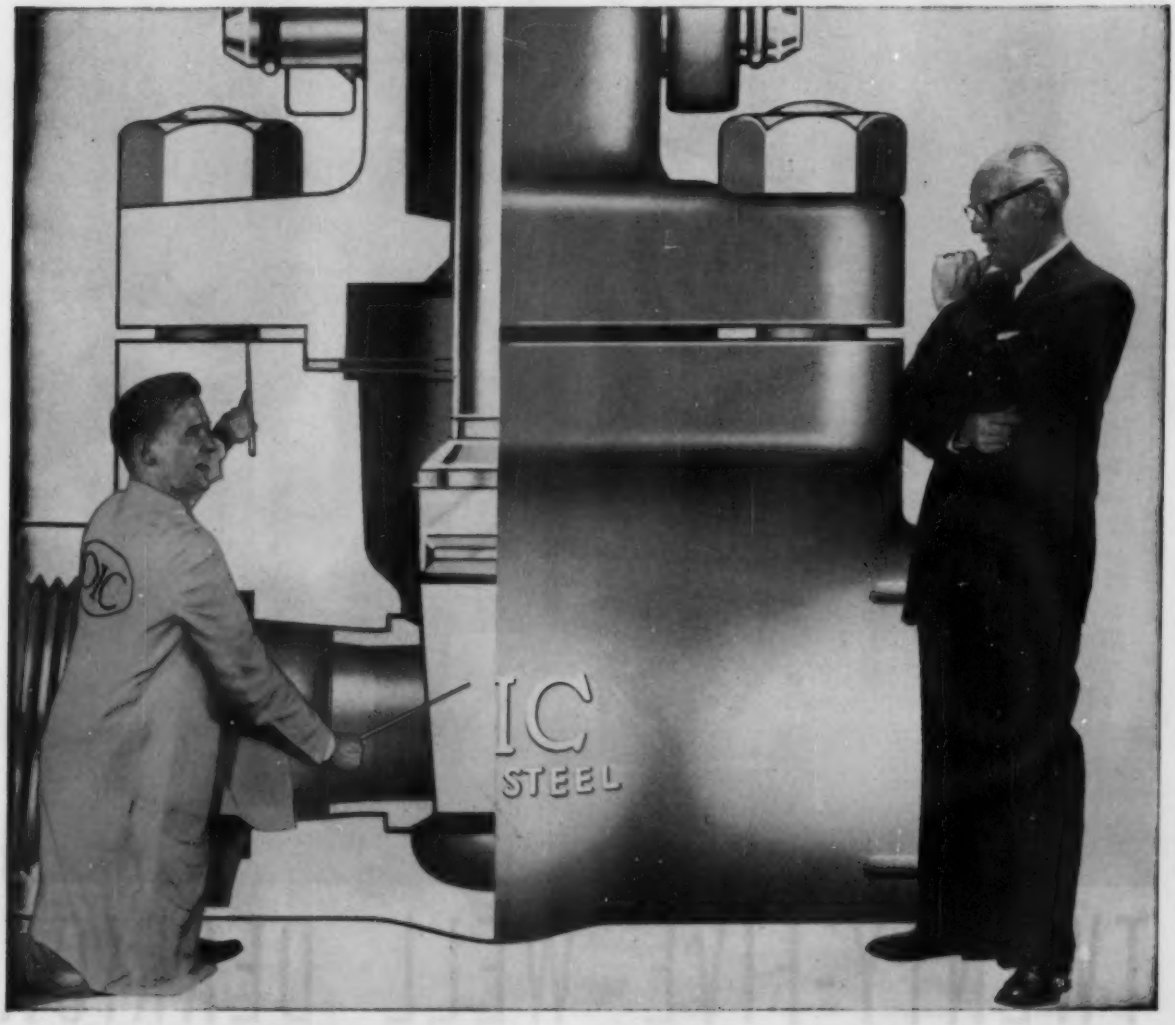
For further information write for Bulletin 5018

DE LAVAL *Steam Turbine Company*

810 Nottingham Way, Trenton 2, New Jersey

BL-443

...and you can see here....and here, sir, how we've killed maintenance problems on our new forged steel lines.



We stop galling and erosion by giving you 13% chrome stainless steel trim with wedges *duracased* to a rugged *1000 Brinell hardness.*

The square and *bolted* body-bonnet joint makes it easy to service the valve quicker. And it's a tighter joint, made doubly leakproof by recessing the soft iron gasket into the body. The gasket can't blow!

And you get the fastest joint make-up you've ever seen. Look at those pipe ends. See the extra wrench-gripping area and lugs. See how body-bonnet flanges are out of the wrench's way. No time lost here!

These new 600-lb. OIC forged steel valves are available with either *high-flow* ports (1300 line), or *standard-flow* ports (1100 line). Call your OIC Distributor, or write for specification literature.

The Ohio Injector Company • Wadsworth, Ohio

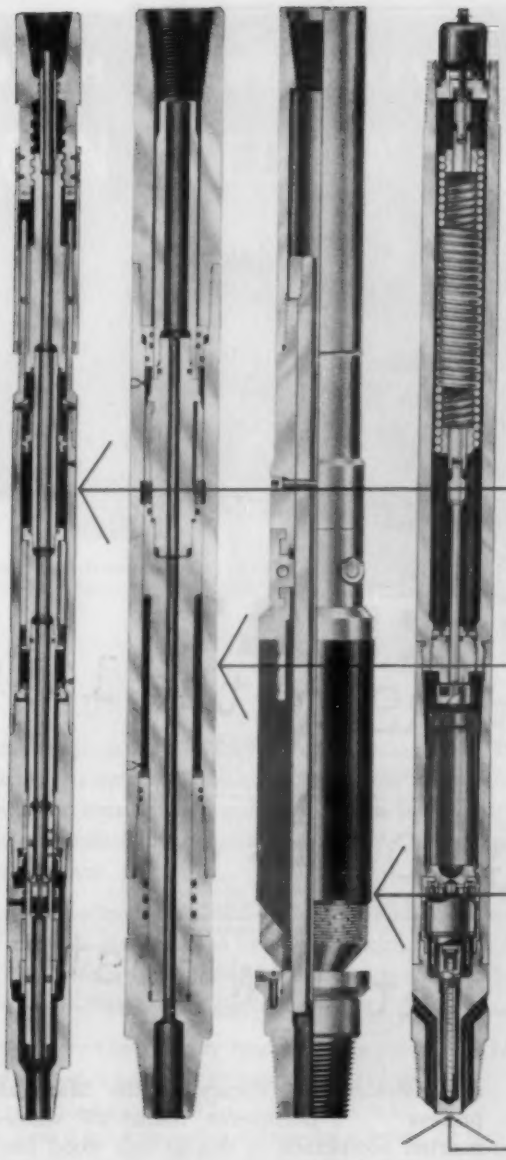
OIC VALVES | BRONZE, IRON, FORGED AND CAST STEEL, LUBRICATED PLUG VALVES

TWENTY-FIVE WELL DERRICK

The derrick on the Standard (California) — Humble drilling platform off the coast of Summerland, California, is designed for drilling two wells simultaneously and provides adequate clearance for drilling a total of twenty-five wells from one setting of the derrick. Lee C. Moore was honored to participate to the extent of the derrick and substructure.

LEE C. Moore

LEE C. MOORE CORPORATION — P. O. BOX 216 • TULSA, OKLAHOMA • Dallas • Houston • Centralia • Odessa • New Orleans • Denver • Casper • Pittsburgh • EXPORT OFFICE: Room 624, International Bldg., 630 5th Avenue, New York 20, N. Y. • Foreign Licensed Mfr.: Oil Well Engineering Co., Ltd., Cheadle Heath, Stockport, England



the tool the test designed

The Johnston Shut-In Hydraulic Tester. Designed for positive operation under a wide range of testing conditions. One-piece construction means quicker "make-up" and "break-down" saving valuable rig time.

The newest Johnston Jar, the Type HS-1 Hydraulic Jar, answered the needs dictated by drill stem testing operations. More jarring action from this "easy to maintain" tool. Shorter for "easier handling" and faster "make-up." Designed to consistently deliver and withstand innumerable shocking blows.

The Johnston Bob-Tail Packer. Its design features a reduction of the necessary rubber diameter while assuring a completely effective seal. The increased by-pass area improves running characteristics and speeds up running and pulling time. In washed-out or out-of-gauge holes a larger packer and packing element gives the same advantages.

Johnston Type "T" Pressure Recorder. Unfailing accuracy, sensitivity and dependability under all types of formation testing conditions. Extensive laboratory and field tests proved the Johnston Tension Type recorder to be more accurate and dependable, consistently, under all conditions.

Johnston's thirty years of manufacturing and testing know-how is easily recognized in The Tool The Test Designed. Each piece of Johnston equipment is designed to meet the requirements of the test under all types of well conditions.

Rely on Johnston for all your drill stem test needs always. Johnston Testers, Inc., Houston, Texas; Long Beach, California; Calgary, Alberta, Canada. Export Sales Office, Houston, Texas.

A WORLD OF EXPERIENCE

JOHNSTON TESTERS

This Policy insures the life of
Cooling Towers
against the hazard of
FUNGAL DECAY
NEW FREE BOOKLET tells
how to add YEARS to the life
of your COOLING TOWER...
at low cost!

Marley's exclusive MARTREAT® process is the *proven* way to halt fungal decay and add years to the life of your water cooling tower—and it can be economically applied to any cooling tower now in service, regardless of age or make.

A new informative Martreat Bulletin sums up Marley's years of leadership and experience in preservative wood treatment for cooling towers—pinpoints the organisms that destroy the effective performance of your tower and eat away your investment . . . prescribes the treatment that arrests these destructive organisms, and its application techniques . . . demonstrates the efficacy of the Martreat process . . . documents industry's wholehearted acceptance of this unique wood preservative treatment.

Only Marley can offer you this form of "cooling tower life insurance" backed by successful treatment of more than four million board feet of cooling tower lumber for the country's largest industrial organizations (name list available) in the petroleum, power, chemical and food processing industries. Write today or ask your Marley representative in any of 56 cities for the new MARTREAT BULLETIN MT-58.

Also available—descriptive folder on Marley's complete engineered reconstruction services

MARLEY

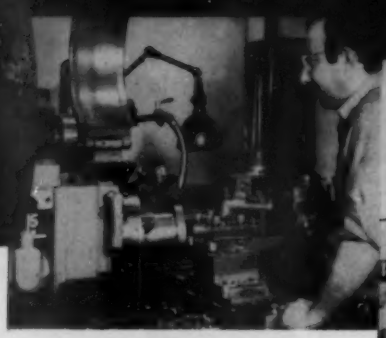
The Marley Company

Kansas City, Missouri

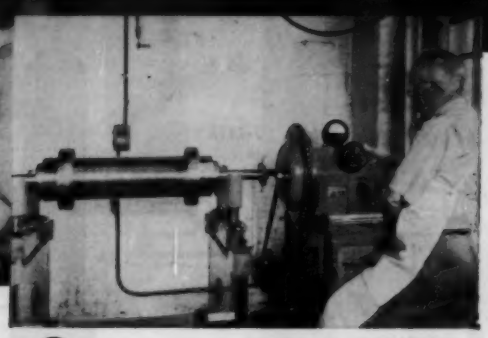
HIGH SPEED DRIVES CALL FOR

JOHN WALDRON High Speed Couplings

1 Unfinished forging for Waldron High Speed Coupling.



2 Machining operation on Waldron High Speed Coupling at New Brunswick Plant.



3 Dynamic Balancing of High Speed Coupling.

Today's high speed turbines and turbine-driven compressors are built like fine watches. They have to be to stand up under the terrific strains and stresses of the greater velocities. Good materials, accurate machining and balancing are essential to their service life and efficiency.

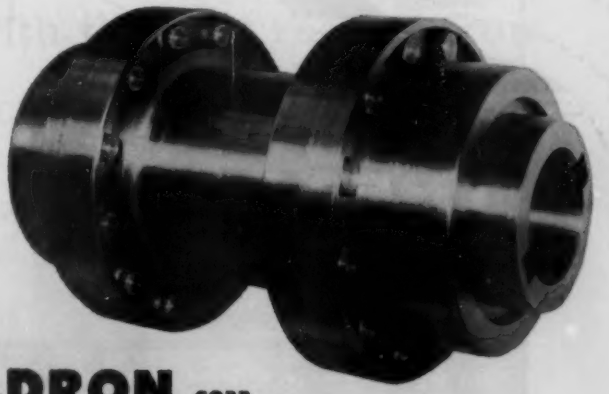
Equally important in the efficient operation of this equipment is the coupling—the power link between the turbine and the compressor. That's the reason for the extreme care in the manufacture of all Waldron High Speed Couplings.

John Waldron uses quality forgings made from SAE 4140 steel, heat treated to a Brinnell of from 285 to 315 on the outer sleeves and 225 to 255 on the hubs. This gives a good operating differential in hardness which is considered beneficial for the longer service life a high speed coupling requires.

The John Waldron method of balancing serves as a double check on the accurate machining. The nuts and bolts are all weigh balanced, the hubs are balanced separately and the complete unit is balanced on an arbor and match marked for ease in reassembly.

The result is a perfectly made and balanced coupling—and one that stresses material, workmanship and design.

4 Assembling High Speed Coupling.



JOHN **WALDRON** CORP.

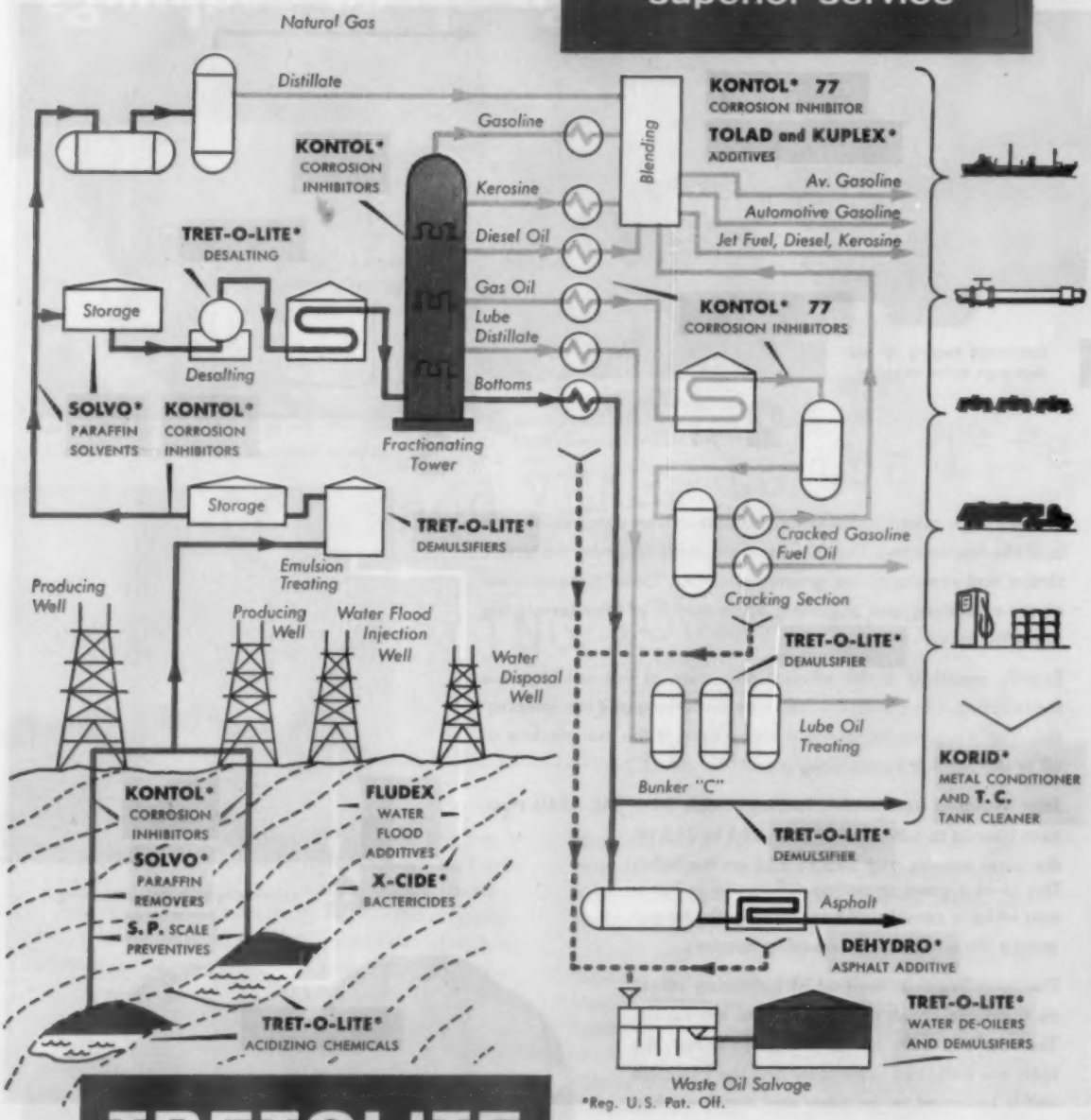
A Subsidiary of Midland-Ross Corporation

New Brunswick, New Jersey

WHEREVER OIL IS PRODUCED, REFINED OR SHIPPED...

TRETOLITE

provides proved products, superior service



*Reg. U.S. Pat. Off.

TRETOLITE COMPANY

DIVISIONS OF PETROLITE CORPORATION

369 Marshall Avenue, St. Louis 19, Missouri

5515 Telegraph Road, Los Angeles 22, California

ASK THE MAN IN THE RED CAR

He'll show you how to get maximum results at minimum cost from any or all of the Tretolite Products.

AP-58-8

These are the ones that got away...
but HOMCO Fishing and Cutting got them back. Next time you're stuck call HOMCO
You'll be pleased with the fast results from their experienced crews and special tools.

HOMCO
HOUSTON OIL FIELD MATERIAL COMPANY, INC.
HOUSTON, TEXAS

THE WORLD'S LARGEST INDEPENDENT OILFIELD SUPPLY AND SERVICE ORGANIZATION

RESEARCH • ENGINEERING
DEVELOPING • MANUFACTURING

DIRECTIONAL DRILLING • FISHING & CUTTING • ELECTRICAL WELL SERVICES • OILFIELD SUPPLIES • EXPORT TOOLS & SERVICE

Another **WELEX** PRODUCTION GUIDE

INDUCTION ELECTRIC LOG

BETTER THREE WAYS

1. **Better thin bed response.**
2. **Deeper Investigation.**
3. **More detail.**

You get all three field tested advantages with the new Welex 5-coil Induction-Electric Log.

WELEX, INC.

General Offices:
1400 East Berry, Fort Worth, Texas
Division offices in
Denver, Houston, La Habra, Midland,
New Orleans, Tulsa and Wichita.
District offices in every major oil center.
Subsidiaries in
Canada, Peru and Venezuela.

They Say—

Wyoming open hole champ?

Dear Sir:

Neither the Phillips 1-EE University nor the Coline 1 Sessums (OGJ, Oct. 10, p. 39) holds the record for open hole, but the Husky 1 McCulloch Peak Unit may.

This well, in Park County, Wyoming, in the Big Horn basin, was originally drilled to 12,299 ft. by Trigood. About 5 years later, in 1955, Husky deepened it to 15,627 ft. The only casing was 1,023 ft. of surface, making approximately 14,604 ft. of open hole.

H. A. Pelton
Mobil Producing Co.
Worland, Wyo.

Too new for mistakes

Dear Sir:

Thank you for sending me the published report on my speech at the management luncheon session of the thirty-third annual meeting of the California Natural Gasoline Association (OGJ, Oct. 13, p. 84). I note, however, that the first two paragraphs of the report contain an unfortunate implication. These paragraphs read as follows:

"Refiners thinking of installing electronic computing and data processing equipment for process control should profit from mistakes of many early users.

"Dr. Joseph F. Manildi, general manager of Thompson-Ramo-Wooldridge Products Co., said many expensive and complicated units have been installed without first knowing if they were really needed or how they should be used."

As I attempted to make clear in my speech, the "mistakes of many early users" correctly apply to electronic computers used for business data processing. That field is nearly a decade old, and it is common knowledge today that many accounting departments are suffering as a result of installing data processing equipment without first having carefully evaluated the economic benefits to be derived.

On the other hand, the use of computers for process control is, of course, a very new field. The first closed-loop control system for a refinery process unit is our RW-300 computer control and data logging system, which is being installed on the catalytic polymerization unit at The Texas Co.'s Port Arthur, Tex., works. This system will be on stream near the end of the year.

In all other respects, the report on my speech was accurate and complete. We are pleased that The Oil and Gas Journal gave it such full coverage.

Joseph F. Manildi
General Manager
Thompson-Ramo-Wooldridge
Products Co.
Los Angeles.

Thanks for first-rate review

Dear Sir:

I want to express my appreciation for the absolutely first-rate review of my recent book in your September 22 issue ("Costs Key to Oil's Future Energy Role," p. 64).

Every author tries to bring out his principal points in his summary but that review was a far better summary than the one I wrote myself!

Cornelius J. Dwyer
Consultant
New York.

Fields not in concession

Dear Sir:

Regarding your issue of October 13 (page 87), we beg to inclose a map (of French Equatorial Africa) issued in October by Ste. des Petroles d'A.E.F. (SPAEF), which shows that the area covered by the deal between that company and Mobil Oil Francaise and Mobil Oil Exploration West Africa does not include the productive fields of the Port Gentil area.

This fact is not apparent on your map, probably on account of the scale.

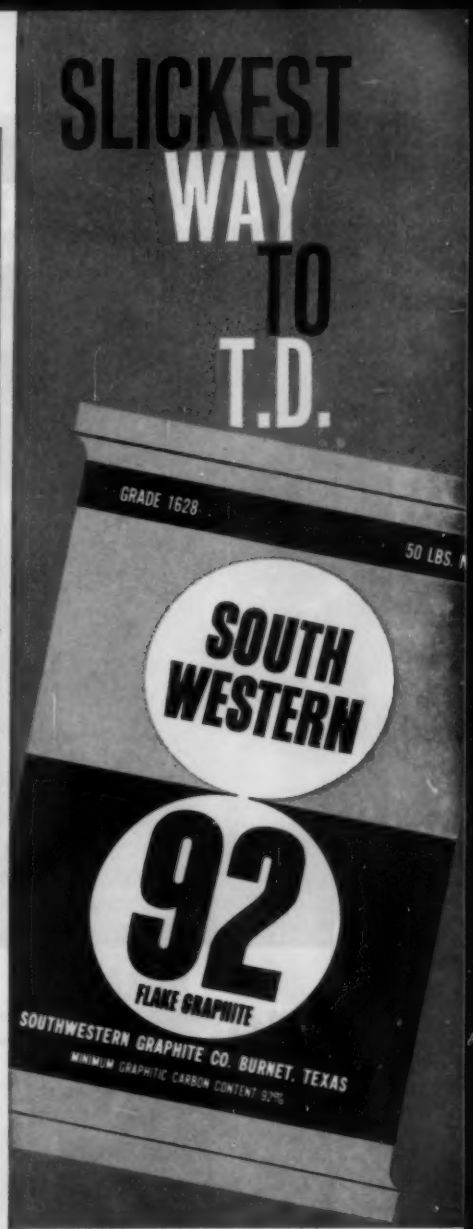
Lebel, Laborne & Cie.
Paris.

Destructive wage formula

"When we begin talking about putting righteous curbs on labor's power to produce inflation, we'd better do a little self-examination. Not all our problems come stamped 'Made in Washington.' Some are created by management themselves, as in the too-easy acceptance of . . . the productivity formula.

"It's a formula that is . . . as potentially destructive of national welfare as any crackbrained scheme ever devised by a bureaucrat.

"Productivity increases can be justified from the standpoint of the common good only if they produce a



USED AND RECOMMENDED

. . . *especially* under conditions where TORQUE, DRAG, OR THE HAZARD OF STICKING DRILL-STEM AND CASING are encountered.

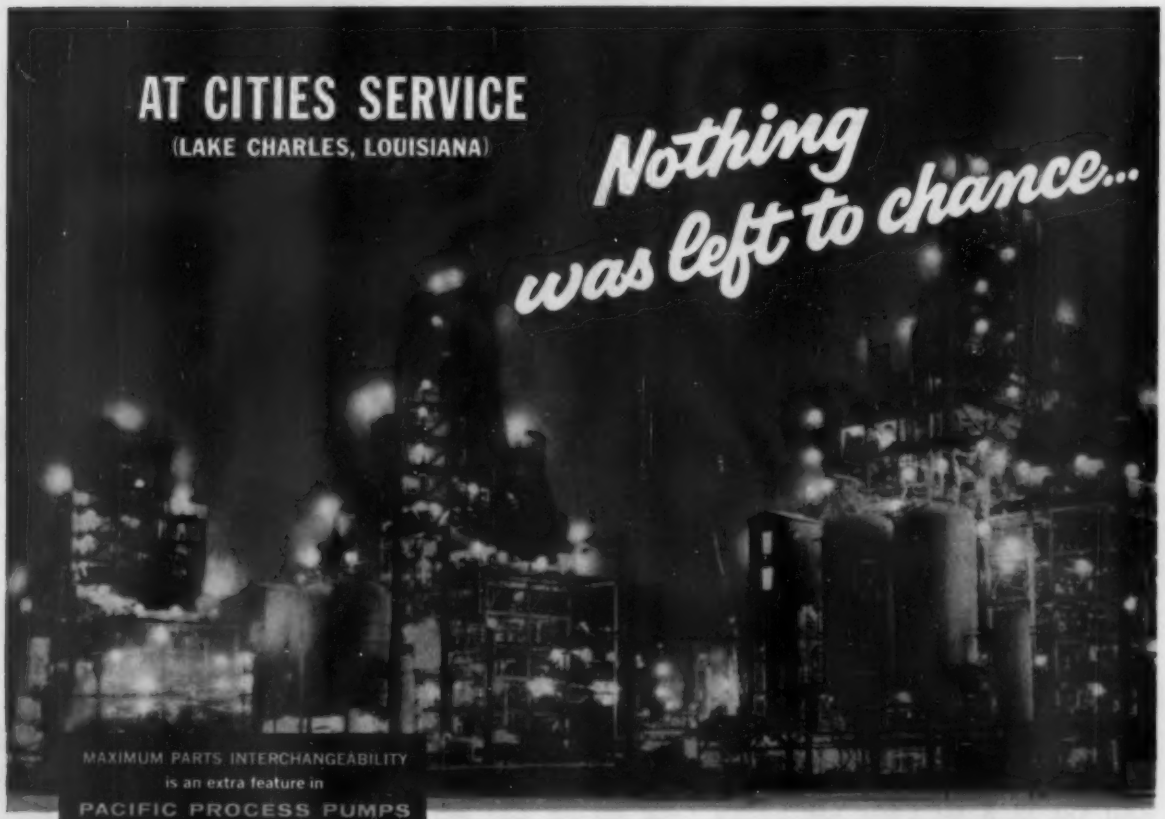
FIVE YEARS OF FIELD EXPERIENCE

have proved the effectiveness and versatility of

SOUTHWESTERN FLAKE GRAPHITE

Available through your mud dealer.

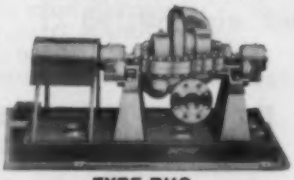
92 **SOUTHWESTERN GRAPHITE CO.**
BURNET, TEXAS



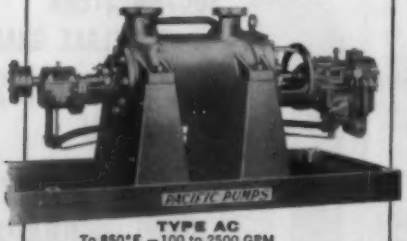
MAXIMUM PARTS INTERCHANGEABILITY
is an extra feature in
PACIFIC PROCESS PUMPS

TYPE SVC
To 850°F.—25 to 3200 GPM
To 600 PSIG—To 650 DIFF. HD. FT.

TYPE HVC
To 850°F.—600 to 4500 GPM
To 600 PSIG—To 1000 DIFF. HD. FT.



TYPE RHC
To 500°F.—50 to 3000 GPM
To 700 PSIG—To 1300 DIFF. HD. FT.



TYPE AC
To 850°F.—100 to 2500 GPM
To 1000 PSIG—To 2600 DIFF. HD. FT.

Practically 100% PACIFIC

process pumps are in service at:

CITIES SERVICE REFINERY
PETRO-CHEMICAL, INC.
CIT-CON, INC.

The three fluid catalytic crackers illustrated have established new records for continuous operation since going on stream. Under the most demanding service conditions, all three units came through remarkably. Number two unit operated for 1058 consecutive 24-hour days only to be outdone by its sister unit with a record of 1065 days continuous operation. We feel that the 100% Pacific installation (including slurry pumps) contributed to making these run-records possible.

Elsewhere throughout Cities Service, P.C.I. and Cit-Con operations, Pacific process pumps are delivering equally dependable 'round-the-clock service...convincing evidence that "nothing was left to chance."

Write for Complete Line Bulletin 1C plus individual bulletins for pumps illustrated in panel.

PACIFIC

PACIFIC PUMPS INC

A Division of Dresser Industries, Inc.
HUNTINGTON PARK, CALIFORNIA

CP-20

stable economy. If they do, those using them don't need a cost-of-living storm cellar.

"If we're actually to combat inflation, we're going to have to restore the mechanism of passing on productivity gains, when they're registered, through price reductions to benefit the entire public. We're only cutting our own throats when we turn over all productivity gains, and sometimes more than all of them, meekly to labor."

John E. Swearingen, president, Standard Oil Co. (Ind.), in a speech to the Indiana Manufacturers Association.

The case for wider spacing

"The need today is for additional reserves and not a mere excess number of prorated wells.

"A wider spacing pattern will not only expedite the time when the limits and reserves of a particular pool will be known, but will free capital, men, and equipment for the discovery of new reserves.

"Producers are limited in their search for new reserves if their available capital, men, and equipment are devoted to the drilling of clustered, closely-spaced offset wells. The increased producing rates of a fewer number of wider-spaced wells make the drilling of more exploratory wells and the search for new reserves far more attractive.

"Wider spacing does not necessarily mean that, over all, less wells will be drilled. It merely means that the wells will be drilled where they will serve a more useful and profitable purpose than merely offsetting and reducing the allowable of existing, prorated wells that could otherwise produce the same oil or gas.

"High costs and economic waste are crippling the industry today . . . High well costs cannot be avoided by those who manage to stay in business. The industry has no control over the price of steel, wages, and other costs that go into the cost of a single well. But there is no justification whatever for doubling or quadrupling these already excessive costs by the unwarranted drilling of from two to four times as many wells to recover the same amount of oil or gas.

"The industry is not suffering so much from overproduction as it is from overinvestment."

R. M. Williams, assistant general attorney, Phillips Petroleum Co., in a speech to the section of mineral and natural resources law of the American Bar Association.

Letters to They Say should be addressed to The Editor, The Oil and Gas Journal, Box 1260, Tulsa, Okla.

CALENDAR OF EVENTS

NOVEMBER

17-18 New Mexico Oil and Gas Association, thirtieth annual meeting, La Fonda Hotel, Santa Fe.

18 Chemical Institute of Canada, chemical economics subject division, meeting on "The Canadian Chemical Industry—Export and Growth," Sheraton-Mount Royal Hotel, Montreal.

18-20 Ninth National Conference on Standards, Hotel Roosevelt, New York.

18-20 National Conference on Air Pollution, Sheraton-Park Hotel, Washington, D. C.

19-21 Society of Petroleum Engineers of AIME, Venezuela petroleum sections, Caracas, Venezuela.

20-21 American Society of Civil Engineers, structural division and Kansas City section, conference on electronic computation, Kansas City.

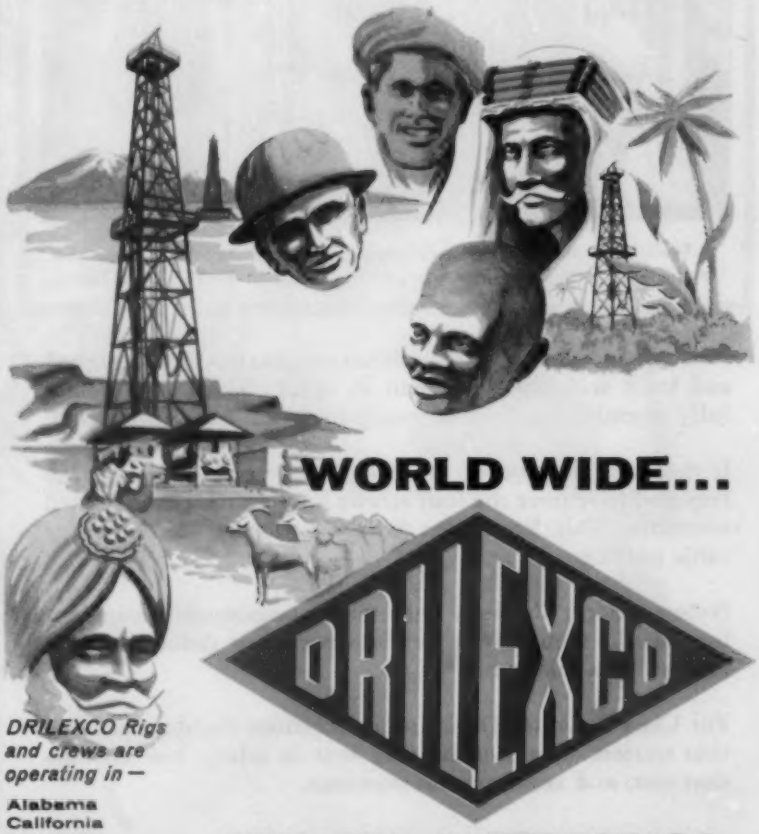
21 Natural Gasoline Association of America, Panhandle Plains regional meeting, Herring Hotel, Amarillo, Tex.

30-Dec. 5 American Society of Mechanical Engineers, annual meeting, Statler and Sheraton-McAlpin hotels, New York.

DECEMBER

1-2 Kansas Independent Oil and Gas Association, twenty-first annual meeting, Broadview Hotel, Wichita.

1-3 Interstate Oil Compact Commission, annual meeting, Kansas City.



DRILEXCO Rigs and crews are operating in —

Alabama
California
Louisiana
Mississippi
New Mexico
Texas
Bolivia
Brazil
Colombia
Arabia
Iraq
Turkey
Holland } DRILVO (Dutch Subsidiary)
Italy } DRILVO (Dutch Subsidiary)
Nigeria } DRILVO (Dutch Subsidiary)

DRILLING CONTRACTORS

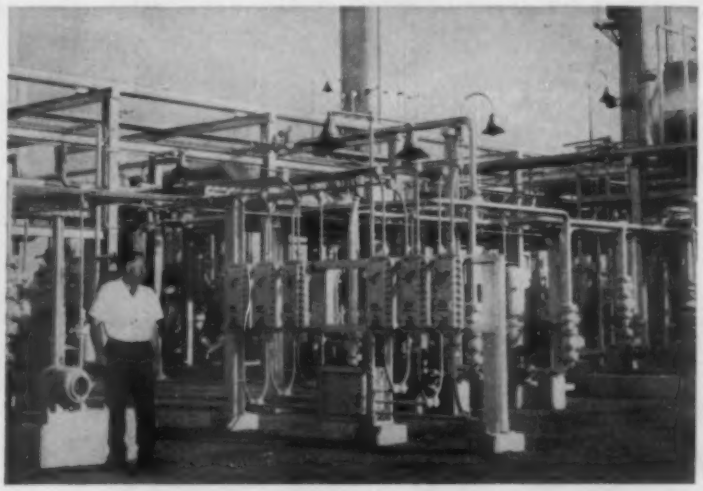
Since 1929 Drilexco rigs and crews have been bringing in producing wells throughout the world. This record of operation has been made possible because of using the best equipment available and a continuous advancement in drilling techniques.

DRILLING and EXPLORATION COMPANY of Delaware, Inc.

600 Exchange Bank Building • Dallas, Texas

Cable Address: DRILEXCO — Dallas

EASILY INSTALLED NELSON STARTERS SAVE FIELD TIME



A few of the many Nelson explosion-proof, combination starters used in the Sunray Mid-Continent natural gas plant at Redfish Bay, Texas.

Nelson explosion-proof combination starters are designed and built with the field man in mind. The starter comes fully assembled and wired, ready for quick easy installation.

If the cable pulling job is difficult only a few minutes are required to remove the four screws holding the pan mounted assembly. This leaves the whole enclosure available for cable pulling.

Nelson selects and uses only those components recognized for reliable trouble free performance, thus reducing maintenance to a minimum.

For Class I, Group D hazardous locations Nelson combination starters offer you the very best in safety, low installation cost, and minimum maintenance.

For more information on Nelson Combination Motor Starters write for Bulletins 420 and 1026.

OUR 20th YEAR

a major source of electrical control equipment for industry

NELSON *Electric* MANUFACTURING CO.
TULSA, OKLAHOMA

2-4 Asphalt Institute, annual membership meeting, Shoreham Hotel, Washington.
7-10 American Institute of Chemical Engineers, annual meeting, Netherland Plaza Hotel, Cincinnati.
8-10 American Management Association, seminar on management problems of exploration and production, Ambassador Hotel, Los Angeles.
9-13 National Association of Corrosion Engineers, University of Illinois, biennial short course on cathodic protection.
11-12 Mid-Continent Oil and Gas Association, annual ad valorem tax forum, Hilton Hotel, Fort Worth.

JANUARY

22-24 Texas Society of Professional Engineers, annual convention, Shamrock Hilton Hotel, Houston.
23 Natural Gasoline Association of America, Oklahoma regional meeting, Biltmore Hotel, Oklahoma City.
28-29 Annual Midwest Welding conference, sponsored by Armour Research Foundation of Illinois Institute of Technology, and American Welding Society, Chicago section, Illinois Institute of Technology, Chicago.

FEBRUARY

1-6 American Society for Testing Materials, D-2 committee on petroleum products and lubricants, Sheraton-Jefferson Hotel, St. Louis.
2-27 Southwestern Legal Foundation, short course on oil and gas law, Southwestern Legal Center, Dallas.
9-11 American Association of Petroleum Geologists, Rocky Mountain section, ninth annual meeting, Civic Auditorium, Albuquerque, N. M.
11-13 Southwestern Legal Foundation, tenth annual institute on the law of oil, gas, and taxation, Southwestern Legal Center, Dallas.
16-18 American Management Association, seminar on management problems of exploration and production, Hotel Astor, New York.
15-19 American Institute of Mining, Metallurgical, and Petroleum Engineers, annual meeting, Sir Francis Drake Hotel, San Francisco.
24-25 University of Oklahoma, sixth geological symposium, Norman, Okla.
27 Natural Gasoline Association of America, Permian basin regional meeting, Scharbauer Hotel, Midland, Tex.

MARCH

9-11 Midwest Gas Association, annual meeting, Hotel Fort Des Moines, Des Moines.
13 American Institute of Chemical Engineers, Sabine area section; American Chemical Society, Texas-Louisiana Gulf section; sixth annual joint technical meeting, Lamar State College of Technology, Beaumont, Tex.
16-18 Western Petroleum Refiners Association, forty-seventh annual meeting, Hilton Hotel, San Antonio, Tex.
16-19 American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, forty-fourth annual meeting, Memorial Auditorium, Dallas.
19-20 New England Gas Association, annual meeting, Hotel Statler, Boston.
25-27 American Petroleum Institute, Division of Production, southern district meeting, Roosevelt Hotel, New Orleans.

PEOPLE...

Engineers, secretaries, compressor operators, landmen, accountants, welders, geologists, clerks...

We need them all... and more... to operate our 2200-mile pipeline system, the nation's longest. To man our steadily expanding activities in every facet of gas and oil.

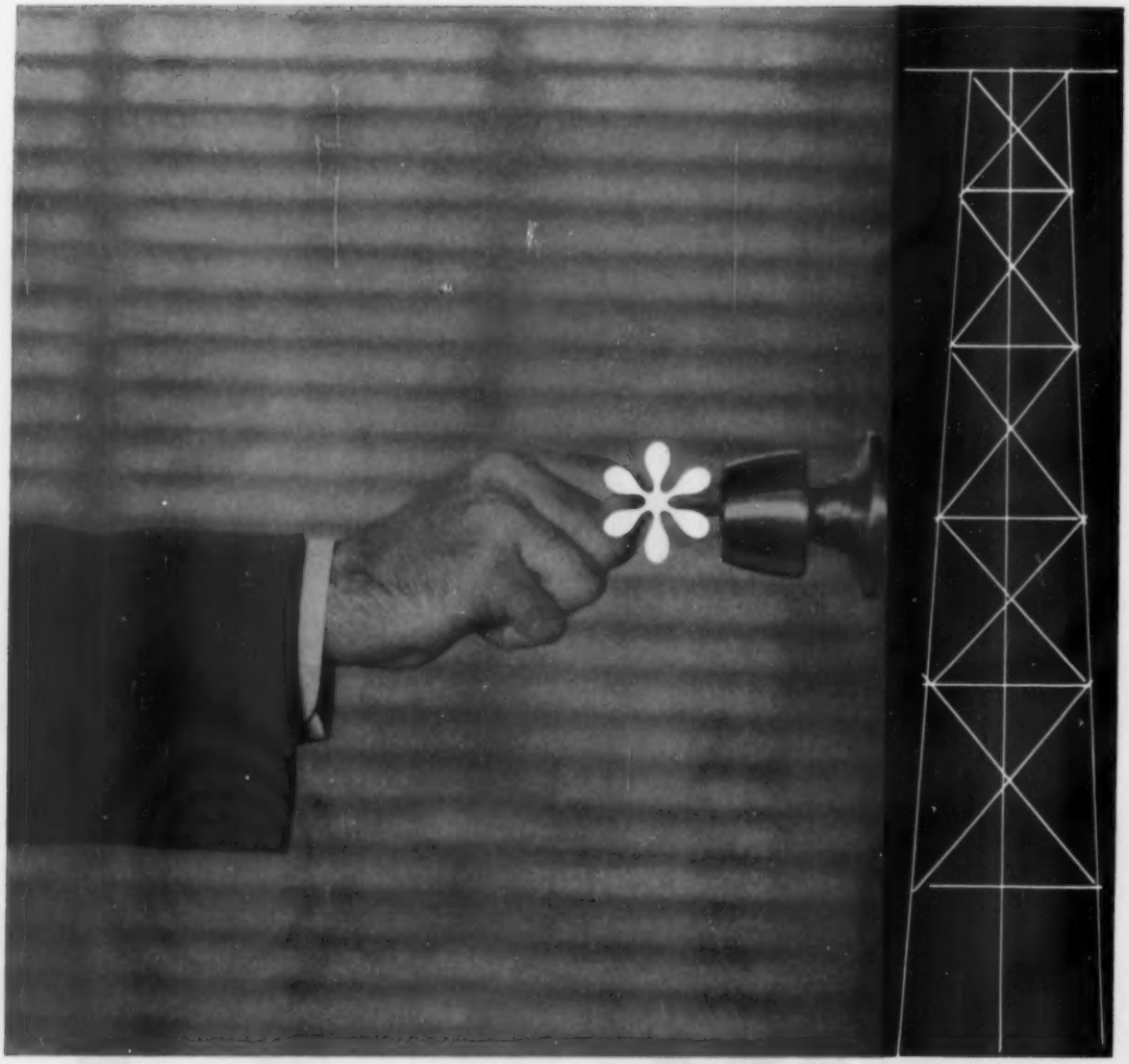
Through them, directly or indirectly, millions of Americans enjoy better living.

A company is... people. We're proud of ours.

TENNESSEE GAS TRANSMISSION COMPANY

AMERICA'S LEADING TRANSPORTER OF NATURAL GAS

HOUSTON, TEXAS



NBT your key to modern oil financing

No financial institution can learn modern day oil financing overnight — it takes a bank that has grown up with the oil industry. National Bank of Tulsa — the Oil Bank of America — was "born in the oil field." Our Oil Department men have for years been dealing with financing for every phase — every division — of the oil industry. This better background in Oil can most likely work to your advantage.

NATIONAL BANK OF TULSA TULSA, OKLAHOMA

Member Federal Deposit Insurance Corporation

NATIONAL BANK OF TULSA
NBT

The OIL AND GAS JOURNAL

TULSA, OKLAHOMA

Published every Monday by The Petroleum Publishing Co., 211 South Cheyenne Avenue, Tulsa, Okla. Phone LUther 4-4411. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

P. C. LAUINGER
President

S. H. ROURKE
Executive Vice President

KENNETH B. BARNES
Vice President and Editorial Director

MITCHELL TUCKER
Vice President and Advertising Manager

HANSON B. PIGMAN
Circulation Manager

DONALD W. WILSON
Manager Industry Census Department

J. PARKER HOLLAND
Production Manager

ADVERTISING OFFICES

TULSA
211 South Cheyenne, LUther 4-4411
JOHN D. REILLY....Mid-Continent Manager
ROY E. FINLEY.....Representative
D. B. MILLER.....Classified Adv. Mgr.

NEW YORK
500 Fifth Avenue, LOngacre 4-6160
E. S. KLAPPENBACH.....Eastern Manager
HARRY B. BULLEN.....Representative

PHILADELPHIA
1509 Land Title Building
Broad and Chestnut Streets
Rittenhouse 6-0118
JOHN W. MEANY, JR.....District Manager

CHICAGO
105 West Madison Street, CEntral 6-2537
DAVID T. KENNEY.....District Manager
KAREL WEGKAMP.....District Manager

DETROIT
204 Washington Square Building
Royal Oak, Mich., Lincoln 7-9455
JOHN D. YODER.....District Manager

PITTSBURGH
106 Nelson Avenue, FRemont 1-7775
ALFRED M. JONES.....Manager

HOUSTON
802 American Investors Building
CApitol 4-7726
JOHN M. SPEARS.....Gulf Coast Manager

DALLAS
1238 Mercantile Building
Riverside 8-3074
PREN G. HOLLINGSWORTH..Representative

LOS ANGELES
650 South Grand Avenue, MAdison 2-0722
GEORGE O. RUPPERT.....District Manager

ENGLAND
National Provincial Bank Chambers
15 Grafton Street, Altrincham
Phone Altrincham 3160
HARRY BECKER....European Representative

Subscription rates to the petroleum industry United States and foreign, 1 year, $5.00; 2 years, $8.00; 3 years, $10.00. Single copies $1.00. Back copies when over a year old, $2.00. Note: Payments from outside the U.S.A. may be made by international money order, New York exchange, or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under act of March 3, 1879. Copyright 1958 by The Petroleum Publishing Co.

Member
Audit Bureau of Circulations
Associated Business Papers

JOURNALLY SPEAKING

Confessions of an Assistant

THE TROUBLE with being an Assistant to Somebody is that sooner or later Somebody goes on vacation and the Assistant is left to mind the store.

As assistant presentation editor for the Journal, I was rocking along comfortably until the Journal's presentation editor, Lynn Nichols, took off for a Colorado vacation.

The first couple of days hustled past smoothly and I began to wonder why Nick always had that harried look in his eye. On the third day the calm ended with a bang when the head of the engineering department asked, "Where are the drawings on the Franistan piece?"

Well, I didn't know the first thing about the Franistan piece, so I figured it was an article that Nick had handled. I answered, "I imagine they're just where they belong, in the file. I'll get them for you."

Now, I've done that a thousand times, I suppose, and the material is always right there in the files where it should be. This time it wasn't. I mumbled, "Uh—I'll tell you what. I'll check on it and bring it right in." To collapse a thousand years of worry into 4 seconds of reading time, I found the drawings—the author had borrowed them for some unnamed purpose—and turned them over to the engineer who was looking for them.

I dived back into my own work. Then a makeup man from the back shop loomed over my desk. Flourishing a makeup dummy, he pointed to a penciled title. "What size you want this?"

It wasn't one of mine, so it had to be Nick's layout. "Make it 36-point Tempo Bold," I said authoritatively.

He looked me over carefully. "I tried that. It doesn't fit."

"Oh." I took the makeup dummy and inspected it carefully. Lifting the corner of a photograph proof which had been pasted onto the dummy, I found the notation: "30 T.B." in Nick's handwriting. I casually tossed the dummy back to the makeup man and said, "I believe 30-point Tempo Bold will do the job."

"Yeah," he answered, then added, "When will Nick be back?"

"Oh, he just left 3 days ago," I replied.

The makeup man stared at me. "Is that so? Seems a lot longer."

Well, that fixed me up for THAT day.

Next morning, the engraver called. "Say, about those engravings."

"I beg your pardon?"

"Those engravings Nick ordered. How big does he want the oil-well photo?"

I don't mind telling you I'd never even **heard** of the oil-well picture, but I wasn't about to let the engraver know that. "I'll just check that and call you back," I told him.

Half an hour later I was still checking when the engraver called. "Never mind, Nick marked it on the picture but I missed it the first time I looked."

An hour later, the phone rang again. It was the production department. "When will that cover be ready for the press?"

Not only did I not know what cover he was talking about, I've never even WORKED on a cover before. By this time, though, I knew just what to say: "I'll tell you what, I'll check on that and call you back."

I had just finished ransacking the top of Nick's desk, searching desperately for anything that looked like a cover, when the phone rang again. The production-department voice said heartily, "I just remembered that Nick told me the news department would handle the cover this week."

"I believe that's right," I agreed, as if I had known it all along.

And so it went. It got to be a regular adventure to come to work. It turned out that Nick had taken care of all these problems one way or another before he left, but before I found that out each time I would age from 2 to 6 months at a whack. I figure I lost 4 years, 7 months, and 18 days off my life during the 2 weeks Nick was rambling around Colorado.

The morning Nick returned from his vacation, he said to me, "How did things go?"

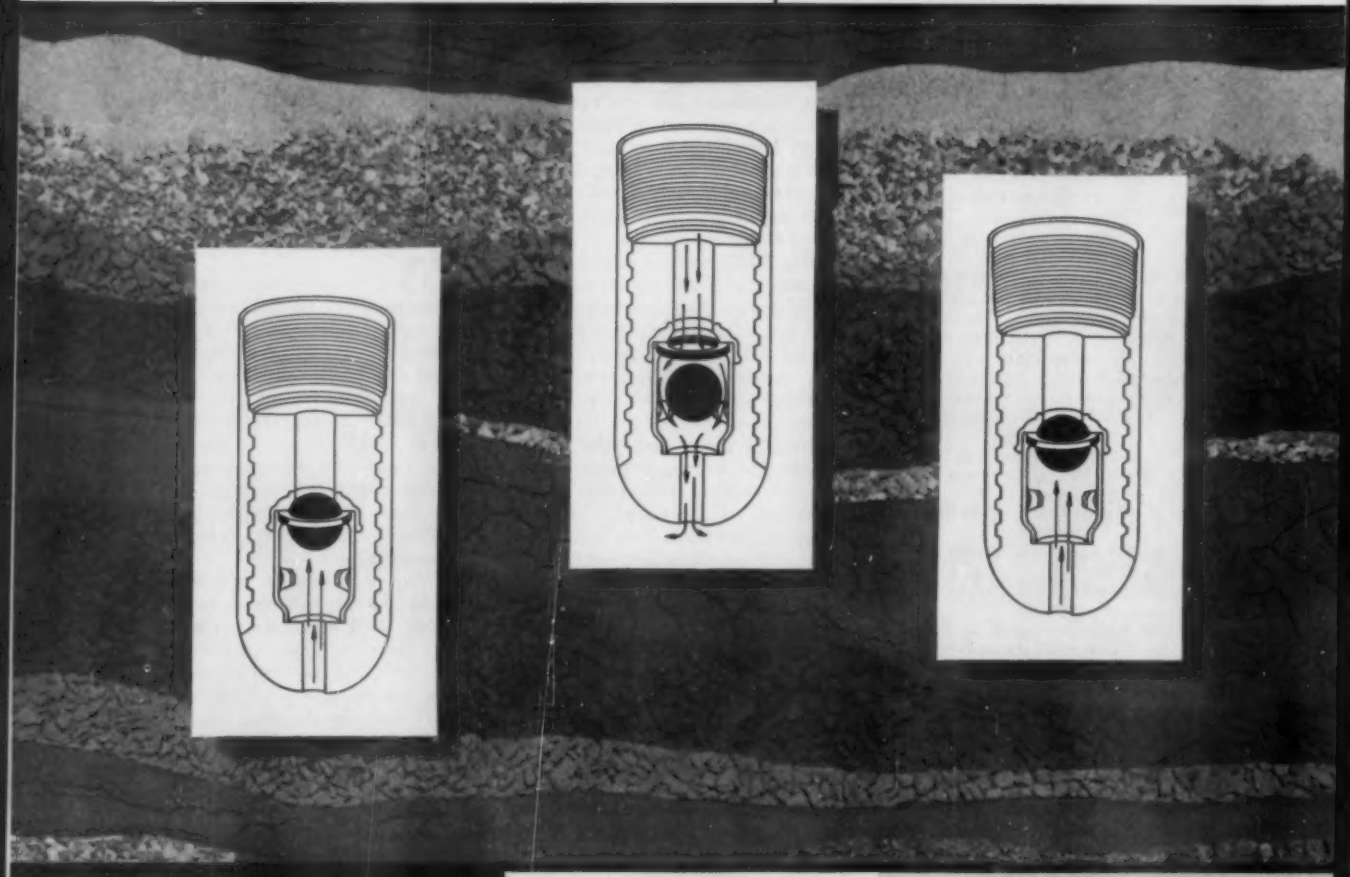
I thought a minute and then carefully replied, "Oh, everything moved right along."

And it had, too.

—*Max Batchelder.*

NOTHING SEALS LIKE THE *BAKER* "FLOATING" BALL

It "rolls with the punch" of circulating fluid and cement slurry — never stationary long enough to be eroded or cut away in any one place on its continuously smooth sealing surface.



RUNNING IN

The floating ball — in the securely anchored Bakelite cage — maintains a leak-proof back-pressure seal against high- or low-pressure differential while the casing is "floated" down the hole. Note the absence of springs or guides to warp or stick and prevent a positive shut-off.

CEMENTING

Ample passageways are provided for the cement slurry, which cannot erode or damage either the protected sealing ring or the revolving ball as it rests on strong fingers in the Bakelite valve cage. When cementing is completed and pump pressure is stopped . . .

AFTER CEMENTING

. . . the ball floats upward to seat and seal instantly against the recessed sealing ring. There are no aluminum parts or steel springs to drill up — only Baker concrete and Bakelite which break up into small fragments and circulate out of the hole.

For better all around PRIMARY CEMENTING use Baker Casing Centralizers and Baker Wall Scratchers with *your* choice of Baker Cementing Shoes and Collars.

BAKER SHOES AND COLLARS

with the dependable Floating Ball

BAKER OIL TOOLS, INC. HOUSTON · LOS ANGELES · NEW YORK

Oil gives attention to its mental health

THE prevailing feeling in the petroleum industry, as reflected in various industry conventions this fall, is one of confusion, frustration, and indirection.

There is no longer the fear of an imminent market collapse and economic chaos, such as prevailed a year ago. It is recognized that the recession has about run its course and that the stage is set for a somewhat higher level of business activity.

But the industry appears to be milling around rather aimlessly, wondering what the long-range economic trends have in store for it, fearful of what Government may do to it, marking time while pondering what course it should take.

WHAT IS NEEDED is a cause to rally around—a program to inspire action—a leadership to point direction—something to add meaning and zest to the day-to-day business of making a living out of oil.

Some starts toward providing such were made last week at the API meeting.

The industry was assured that it is not presiding over its own wake; that there is plenty of reason for confidence that demand for its products will soon resume a sharp upward climb, that tremendous quantities of new domestic reserves will be discovered, and that production costs can be kept down by application of knowledge already at hand.

In short, the industry's physical health is in pretty fair shape. Where attention is needed is its mental health. It needs some occupational therapy to work off its gloom and frustration.

Some promising projects were presented. They lie in the fields of political activity, public education, and dealing with critics and with state and federal governments as equals rather than as mendicants.

This will be a new role for oil men, and one which they may find difficult to adopt. In the past their periods of mental depression have been worked off through physical activity such as racing to adopt a new technology, filling an unexpected demand, or meeting shifting market patterns.

BUT IF THE INDUSTRY will follow the advice given it to take positive action to counteract the conditions that make it so gloomy today —to change the public psychology and political attitude about oil—it will, by reason of this new interest and activity, come to feel that life in the oil business is worth living.

And there is every reason to believe that positive results can be obtained objectively as well as subjectively. Political conditions can be changed; public attitudes can be reversed. It's certainly worth trying.

The public admires a fair, dedicated fighter, particularly an underdog. Oil men can eliminate both their underdog position and their whipped-pup psychology by rallying to fight for their future on the public hustings.

LUMMUS

ENGINEERS AND CONSTRUCTORS

385 Madison Avenue

FOUR NEW DESULFURIZER-CATFORMERS PART OF BRITISH AMERICAN OIL CO.'S QUALITY IMPROVEMENT PROGRAM

Lummus Now Building Fourth Unit: Has Handled All B-A Catformer Construction Since 1954

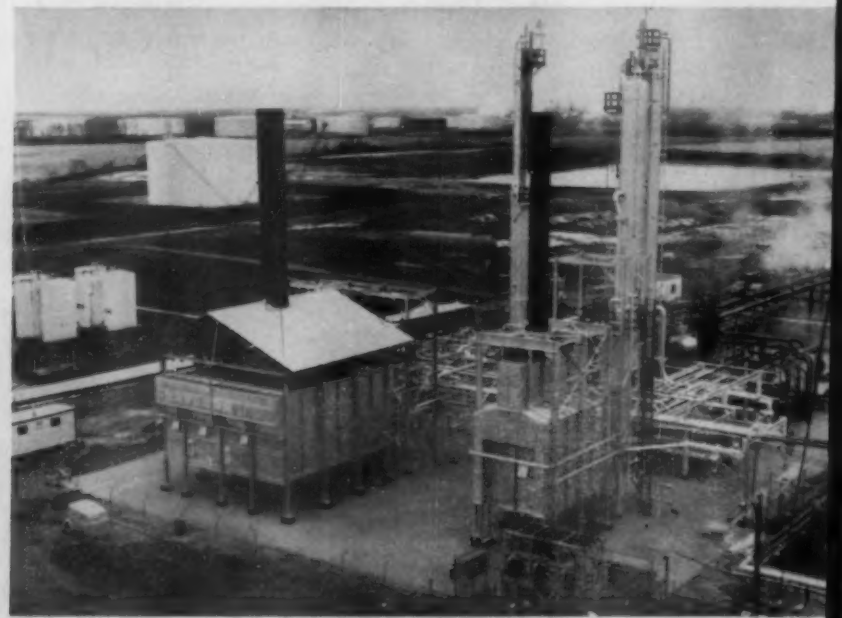
Since 1954 the British American Oil Company has authorized several million dollars worth of desulfurizer-Catformer units at four refineries throughout Canada as part of their quality improvement program, which is designed to produce a higher octane gasoline for industrial and consumer use.

These facilities, engineered and constructed by The Lummus Company Canada Limited, have been completed at Montreal East, Quebec; Clarkson, Ontario; and Edmonton, Alberta. A fourth facility at Moose Jaw, Saskatchewan has been awarded to Lummus and is scheduled for completion by October, 1958.

The Edmonton Catformer, with a capacity of 5,400 B/D, cost

Montreal-East Catformer has 13,000 B/D capacity. Cost is $2 million. Completed early 1955.

Clarkson, Ontario Hydrodesulfurization Catformer cost $2,300,000, has 10,000 B/D capacity. Completed summer of 1957.



Shown is the record-breaking Catformer construction job at Edmonton, Alberta for The British American Oil Company. Completed in mid November 1957, this is the third Catformer engineered and constructed by Lummus for B-A. Since then a fourth unit to be completed by October 1958 is under construction for B-A by Lummus.

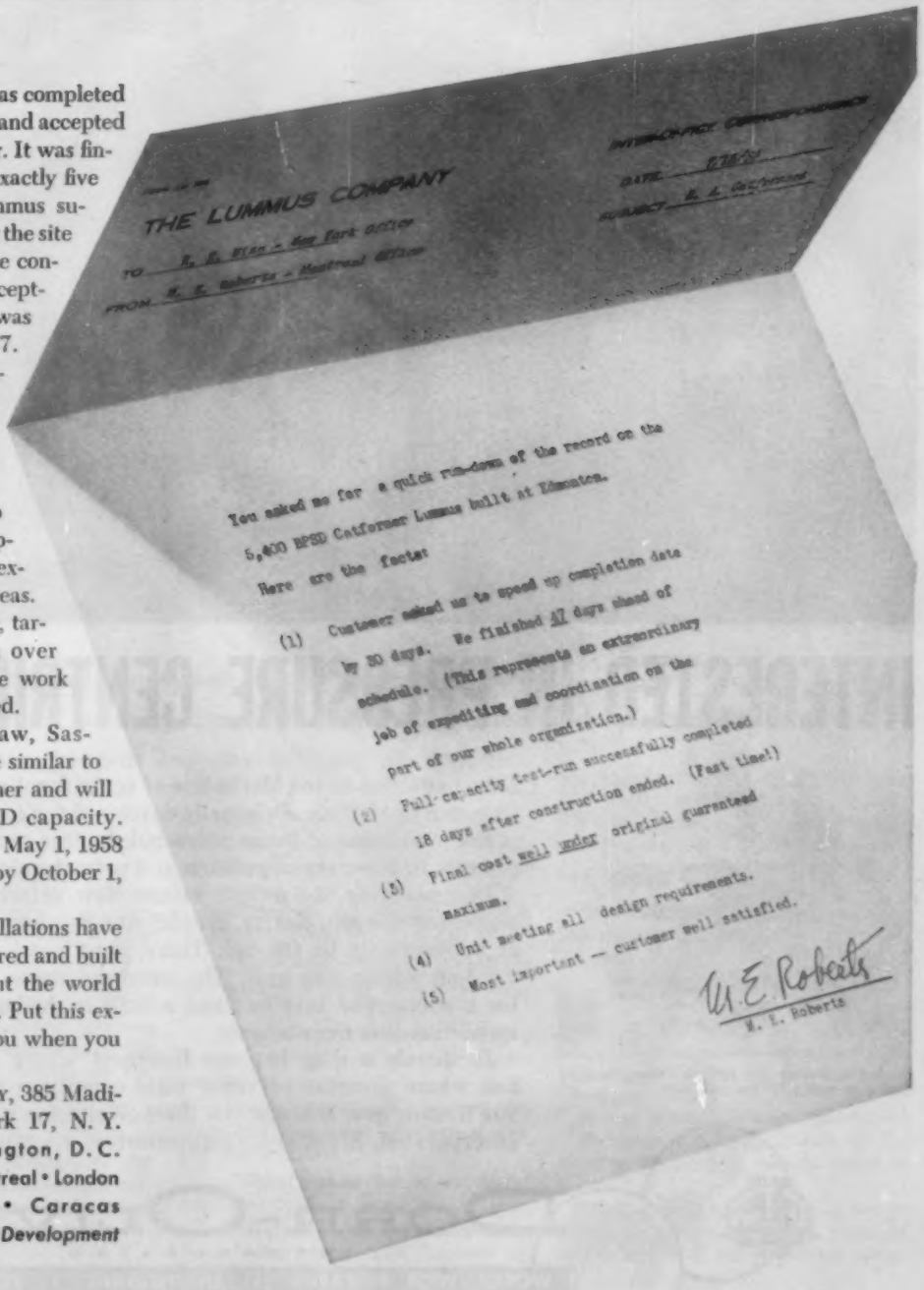
$2,100,000. The Unit was completed on November 15, 1957, and accepted by B-A two weeks later. It was finished in record time—exactly five months after the Lummus superintendent arrived at the site and 11 months after the contract was awarded. Acceptance by the customer was on December 3, 1957.

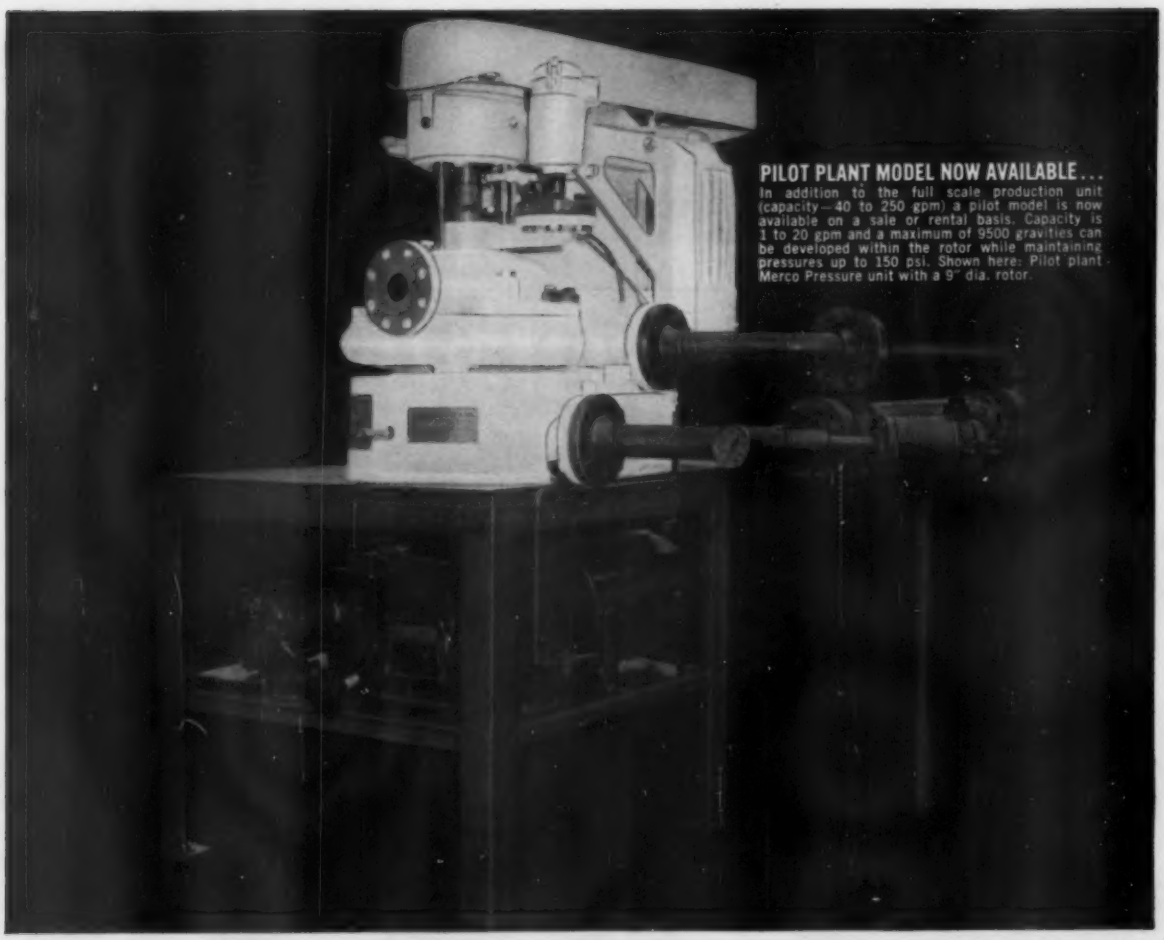
A potentially crippling snowstorm at the site in early October was anticipated by Lummus field engineers, who had temporary steel supports erected over the exchanger and piping areas. When the snows came, tarpaulins were thrown over these supports and the work continued uninterrupted.

The new Moose Jaw, Saskatchewan unit will be similar to the Edmonton Catformer and will also have a 5,400 B/D capacity. Construction began on May 1, 1958 and will be completed by October 1, 1958.

Over 800 major installations have been designed, engineered and built by Lummus throughout the world in the last half-century. Put this experience to work for you when you plan new facilities.

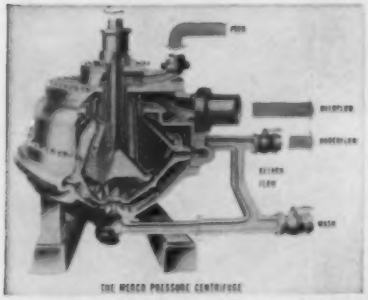
THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, N. Y.
New York • Washington, D.C.
Chicago • Houston • Montreal • London
Paris • The Hague • Caracas
Maracaibo. *Engineering Development Center:* Newark, N. J.


THE LUMMUS COMPANY
You asked me for a quick run-down of the record on the
5,400 BPSD Catformer Lummus built at Edmonton.
Here are the facts:
(1) Customer asked us to speed up completion date
by 30 days. We finished 47 days ahead of
schedule. (This represents an extraordinary
job of expediting and coordination on the
part of our whole organization.)
(2) Full capacity test-run successfully completed
18 days after construction ended. (Fast time!)
(3) Final cost well under original guaranteed
maximum.
(4) Unit meeting all design requirements.
(5) Most important — customer well satisfied.
W. E. Roberts



PILOT PLANT MODEL NOW AVAILABLE...
In addition to the full scale production unit (capacity—40 to 250 gpm) a pilot model is now available on a sale or rental basis. Capacity is 1 to 20 gpm and a maximum of 9500 gravities can be developed within the rotor while maintaining pressures up to 150 psi. Shown here: Pilot plant Merco Pressure unit with a 9" dia. rotor.

INTERESTED IN PRESSURE CENTRIFUGING?



Illustrative drawing of a full scale Merco Pressure Centrifuge with a 30" dia. rotor bowl.

Latest addition to the Merco line of centrifugal equipment is the new Pressure Centrifuge. Originally developed for a catalyst removal step in the production of linear polyethylene, this new unit shows definite promise in a variety of refining and petrochemical applications.

Incorporating the unique return flow principle, this Merco can concentrate, wash, clarify, classify and recover soluble values . . . all at pressures up to 150 psi. There is no nozzle clogging nor solids build-up within the unit. The overhead drive eliminates the need for a submerged bearing; and a built-in, hydraulic hoist simplifies inspection and maintenance.

If there's a step in your flowsheet where centrifuging fits in and where pressure or vapor tight conditions must be maintained, you'll want new Bulletin No. 2600. Write for a copy to Dorr-Oliver Incorporated, Stamford, Connecticut.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U. S. A.

PART OF the 6,283 oil men who registered at the Conrad Hilton attend a session in the grand ballroom.

API Maps Attack Against Oil Woes

• Annual convention focuses sights on upcoming industry problems, mostly political and economic. A bright note is sounded by plans for action to replace general industry attitude of despair.

SCIENCE and technological progress have run ahead of economic and political thinking.

The task facing the oil industry during the next few years is to adapt its practices to this condition. It must take a part in public affairs that wi'l insure the social climate in which progress can continue.

This was a central theme common to a majority of the addresses at the thirty-eighth annual meeting of the American Petroleum Institute.

Different facets and aspects of the same idea were brought out both in talks by prominent members of the oil industry and by speakers from outside it who were invited to give oil men their views on upcoming problems.

The structure of the convention program itself was in tune with the theme of the speakers. There were no papers at all on technical subjects. The entire program was in the realms of management, economic, and political interest.

Specifically, the oil industry was told that it must:

... **Live with** an excess producing and refining capacity for a good many years;

... **Take bold measures** to hold down operting costs, particularly in crude production;

... **Pay closer attention** to both seasonal and long-range forecasts of supply and demand;

... **Make greater use** of economic advice in business decisions;

... **Meet increasing competition** from other fuels and sources of energy;

... **Get into politics** actively in order to combat political trends and groups working against continuation of competition and free enterprise;

... **Revitalize** the public - relations program to put oil industry back in public favor and stop it from being the favorite whipping boy of demagogues.

Final registration for the thirty-eighth annual API meeting was 6,283. This was 172 under last year's total of 6,455 and 194 under the all-time high of 6,477 set in 1954, also in Chicago.

It was a sober, serious convention.

President Frank M. Porter set the pitch in his opening address when he said:

"The outlook is as gloomy today as it has ever been in my 42 years of association with the petroleum industry."

He was referring to the political outlook, the outlook for public ap-

What they said about:

PUBLIC RELATIONS

"You have been stupid, arrogant, and unmindful of the consequences of your behavior."

Louis B. Seltzer, editor, Cleveland Press.

"You think you're being kicked around. What you may not realize fully is that politicians generally think the oil industry is overprivileged and pretty arrogant about it. It's obvious you don't tell your story very well."

Lyle C. Wilson, vice president, United Press International.

"Unless efforts are forthcoming from the industry's own ranks, the Committee on Public Affairs will be nothing but a venture in futility."

Frank Porter, president, American Petroleum Institute.

"Oil companies should not engage in partisan politics. Businessmen, yes. But corporations, as such, have no place in politics. Corporations are not people. Their sole responsibility is to make as much money as they can. By doing so, in a free economy, they thereby serve the social interest of the nation."

Milton Friedman, professor of economics, University of Chicago.

"I think this 'bad press' for business and for sound economics and politics—which we get with too few exceptions—is entirely or largely the fault of us businessmen. I think we can do something about it by becoming better 'news' ourselves and paying more attention to becoming effective in this field."

L. R. Boulware, vice president, General Electric Co.

proval of oil as a constructive industry, the outlook for a governmental environment conducive to further business progress.

And he was not alone in frank expression of a stern view. One after another, speakers told the API:

. . . "**Management** today is required to operate in a sea of economic, social, and political changes."

. . . "**In the higher echelon** of politics the oil industry is in very real trouble."

. . . "**The left wing** is going to move in on you, and the left wing of American politics plays harder than you will fight."

. . . "**You face a choice** between a government supported and controlled by the people, or a people supported and controlled by the government."

. . . "**The fundamental rights** of individuals are falling behind scientific progress."

. . . "**Unless** the industry stands united, there is certain to be further encroachment of the power of the federal Government in the regulation and control of the entire oil industry."

But there was a hopeful overtone throughout the doleful melody—a feeling that the outlook can be changed and a determination to change it.

President Porter himself set the new pitch in this brighter key when he said:

"We must stand up and fight. We should ask where we want to head and then try hard to get things going in that direction. I see every reason for action, not a single excuse for despair."

To this end the API unveiled the program of its new Committee on Public Affairs, which has been a year in the making—a combined plan of public information and political action.

It is a program geared for fighting—to answer attacks and to take the offensive. And its most promising feature is that it will operate largely on the local level and enlist the talents of the rank and file of the industry.

On the business side, too, there was much optimism to offset the political gloom.

Domestic demand, it was forecast, is leaving the static plateau of the past 2 years and is resuming its climb toward higher elevations. During the next dozen years the consumption of petroleum products, both here and in the rest of the world, will increase steadily and rapidly.

Refiners were told that the troublesome seasonal fluctuations in demand may become less severe in the future, and that they can do much to alleviate the present difficulties by gearing their runs, yields, and stocks more closely to the realities of the industry's statistics and forecasts.

Producers were told that they can escape the vise squeezing their profits by adopting a widespread program of reducing producing costs by such methods as operating fewer but more productive wells and introducing efficiencies throughout their operations.

Most optimistic of all was the outlook for future petroleum discovery and production in the United States—the declaration that pessimism about domestic supply is the premature preparation of an obituary.

This came from Morgan J. Davis, president of Humble Oil & Refining Co., one of the nation's largest producers and himself a geologist of note.

With an arsenal of facts and figures he documented the thesis that the domestic industry will be able to maintain the reserves and the producibility to continue to supply a major part of the nation's energy needs for many years to come.

Attack Critics or Be Doomed—Porter

• Oil's political outlook is as gloomy as at any point in history, API is told. Answering criticism will bring on a fight with no holds barred, but it's the only way oil men can protect their jobs, freedom, and reputation.

OIL MEN must speak out as individuals in defense of the oil industry.

If they don't, they'll see their business further deteriorate under federal control and an even more antagonist public opinion.

This warning was handed down by Frank M. Porter in his report as president of the API. He called for active work by everyone who makes his living in the oil industry to strike back at the industry's enemies and critics.

The problem . . . Oil men are unscrupulous, unprincipled, unpatriotic . . . regularly engage in corrupt political activities . . . pursue dirty business tactics . . . cheat on income-tax return . . . engage in price-fixing conspiracies . . . swindle their customer . . . are chronic law breakers . . . undermine the nation's morality.

These, said Porter, are opinions that have gained wide circulation in the United States and are finding acceptance among the American people.

If this is a true picture, then every person engaged in the industry is an accomplice in crime, he said.

"If the oil industry is immoral, then you are immoral for working for it. If it is degraded, then you who work within its ranks cannot hold your heads high. Its shame is your shame, its guilt is your guilt.

"Every accusation made against this industry is a personal accusation against you.

"What are you doing to acquit yourself and your industry?"

Doom not inevitable . . . If the industry thinks that this can be done by the new committee on public affairs, without the help of every individual oil man, Porter said, "then we are finished. Nothing can save us from abject defeat. The committee on public affairs will be nothing but a venture in futility.

"The outlook is as gloomy today as it has ever been in my 42 years of association with the petroleum industry.

"I am even beginning to wonder if we are entering a new ice age for all private enterprises, with ours chosen as the first industry to get the big freeze.

"But I do not believe that we are doomed unless we doom ourselves with inactivity. A warm response now from industry people can melt the ice and change the hostile climate that presses in on us. But it must be a very warm response."

Frank M. Porter

In the technique of political investigation in recent years, the oil man is never presumed innocent—he's always considered guilty, Porter said. And people who deplore the abuse of investigative power against communists and subversives yell for blood when an oil man is in the dock.

"You have their sympathy if all you've done is to conspire to overthrow this Government by force and violence, but if yours is the unforgivable crime of earning your livelihood in the oil business, then they are pitiless in their attack."

"We have seen calumny substituted for sincere debate. Poison gas, outlawed in military war, becomes a favorite weapon in the warfare of politics. That is what we are up against."

Battle for freedom . . . It would seem, said Porter, that the only way you can protect your reputation these days is by going along meekly with any proposal that the oil industry's detractors advance.

"They will ruin you financially, but they will not smear you as long as you submit to their blackmail."

The better way of defending our reputation, he said, is by standing up and answering these critics boldly, factually, and fearlessly.

"They will retaliate as the skunk retaliates," he warned. "That's to be expected."

"This is a real fight—not a sham battle, but a battle for our freedom, our jobs, and our reputation as decent, honest, loyal Americans. Our critics are not sparring, they are slugging."

There are answers . . . As an example of how facts refute allegations, Porter cited attacks on percentage depletion in which opponents "shoot off statistics which are shrewdly contrived to give the impression that the oil industry fends off taxes with one hand while hauling in exorbitant profits with the other."

Critics cite profits in relation to sales, which gives a distorted picture in a heavy-investment, high-cost industry like petroleum, he said, whereas on the basis of net profits to net assets oil-company profits average 14% compared with 15% for all manufacturing.

Taxes paid by the oil industry in 1957 totaled $6,700,000,000, or more than $18,000,000 per day. Porter said if anyone is making an exorbitant profit from the oil industry it may be the Government.

Last year's tax bill was equivalent to $2.24 for every barrel of crude oil processed in the United States last year, compared with the average price of $3.09 per barrel, he said, or 72% of the price of domestic crude at the well and 47% of the wholesale value of finished products.

Furthermore, he warned, requirements of the highway program may soon bring demands for still higher gasoline taxes, and the industry will get the blame for the high price of gasoline to the motorists.

"At this time," Porter concluded, "we should not ask where are we heading, rather, we should ask where do we want to head—and how hard are we willing to try to get things going in that direction."

Oil Unity a Must

. . . Rodgers tells API as he receives Gold Medal award. More federal control is certain if industry is divided.

THE OIL INDUSTRY may be going down the road to socialism faster than other industries, W. S. S. Rodgers, former board chairman of The Texas Co., warned API delegates.

Reason for this belief is division among segments of the industry.

"Unfortunately, a few in our industry apparently are willing to accept for all time some regulation by federal law rather than to work out on a voluntary basis a sensible solution to our problems," he added.

Rodgers' remarks were made during Monday's general afternoon session in a speech accepting the 1958 API Gold Medal Award for distinguished achievement.

Referring to the current industry division over imports and other problems, Rodgers said:

"Unless the industry stands united, there is certain to be further encroachment of the power of the federal Government in the regulation and control of the entire oil industry.

"In my opinion the harm that can result from getting the federal Government further into our business will remain to plague us long after these current problems have been forgotten."

Rodgers declared the common goals in serving the American people outweigh any internal differences. He added that it's the job of oil men to maintain a strong and healthy domestic industry and at the same time prepare for the day when this country will be more dependent on imported oil from foreign sources.

Nostalgia . . . The 1958 delegates enjoyed a few of Rodgers' recollections about other API gatherings.

He recalled his first API meeting was 35 years ago in St. Louis. At the session Henry L. Doherty made an interesting talk on the future of oil. His prediction: A tremendous increase in the sale of furnace oil would be enjoyed by the industry.

Rodgers said with a laugh that Doherty's prediction came true and added that today the industry is witnessing another evolution. Natural gas is supplementing and even replacing part of the furnace-oil market.

Rodgers praised the API move this year to consolidate the work of its public relations groups under the single banner of the Committee on Public Affairs. He termed the action a very important step toward unity within the industry.

He recalled early industry efforts in the 1930's to obtain effective conservation laws in the states to stop economic ruin then threatening the industry and praised work of the APIC through the years.

"The APIC has done a magnificent job," he said. "It has helped to eliminate gasoline-tax evasion. It has helped to eliminate diversion of such revenues to nonhighway purposes. It has helped to see that these funds were applied to the kinds of roads needed for public transportation and to keep gasoline taxes on a sensible basis."

W. S. S. Rodgers
. . . Achievements have been forgotten.

Max Burns presents API Gold Medal . . .

. . . with this citation

"The petroleum industry was little more than half a century old when you became associated with it, and your distinguished career has spanned nearly the entire period of the Gasoline Age.

"During that time you have made statesmanlike contributions to the growth and progress of our industry, as well as to the public welfare generally.

"Your association with the American Petroleum Institute has been a long and noteworthy one, dating back almost to the beginnings of the organization. You have been a director, a member of the executive committee, a vice president, and, since 1953, an honorary director.

"You have served well your industry and your nation both in peace and war—in World War I as an active member of the armed forces and in World War II you served on the Petroleum Industry War Council, the

Plea for unity . . . The oil industry through the years has an excellent record of contributing to the development of this nation's economy and security, Rodgers asserted.

Best example of achievements possible through unity, he said, was oil industry's contributions during World War II. Tremendous amounts of time, money, and manpower were thrown into refining, production, pipelining, and tanker projects. And at war's end the U. S. oil industry had supplied almost 70% of the war's monumental demands for petroleum products.

These achievements have been long forgotten both by the public and by many of our politicians, Rodgers reminded.

"Today there are many who are attacking this industry and want to regulate and restrict our way of doing business in a free economy," he warned. "If these enemies of free enterprise are successful, we may be headed for a form of socialism in this country."

His advice: Forget the traditional "go-it-alone approach" and find a way of united action in keeping with the principles of free enterprise.

Rodgers wasn't all pessimism, however. He observed that the oil industry has men with talent and vision to solve its problems just as oil men have in the past. He also predicted that the oil industry both in this country and abroad will continue to grow as it serves mankind.

Foreign Petroleum Operating Board, and as chairman of the Committee on Synthetic Rubber. You were a member of the National Petroleum Council from 1946 to 1952, and since 1944 you have served as a member of the Business Advisory Council for the Department of Commerce.

"As a trustee of the National Safety Council and as chairman of its board for many years, you have rendered outstanding service to the cause of safety, not only within the industry, but in the public interest as well.

"By your enlightened understanding of the arts, you have brought the enjoyment of great music to millions of your fellow men, and have helped to promote a better understanding of the social responsibilities of our industry.

"In awarding this medal to you the American Petroleum Institute is proud to recognize the achievements of an outstanding member of the industry and a truly great American."

Pressure Politics Decried

. . . by Romney who says gravest threat to nation coming from big government, big business, and big labor.

BUSINESS MEN should get into politics—but as individuals and not as pressure groups.

It's just as immoral for big business to dominate a political party as it is for big labor. In each case, the businessman and the laboring man should express his political beliefs as an individual.

These observations on business' role in politics were given to a packed API general session by George Romney, president of American Motors Corp., Detroit.

The political climate for oil following this month's elections and what the industry should do to improve its political standing have been issues studied by oil associations and companies.

Romney advised that business should not imitate the unions. He said they are trying to control political parties by organized pressure and the result often may not represent the individual union man's feelings.

"Our political system is designed to try to keep political power dispersed," Romney said. And monopolies in politics are just as immoral as they are in business.

"Business should try to stop a labor monopoly of a political party but should not imitate labor's tactics," he asserted.

George Romney
. . . Make the consumer boss.

A threat in bigness . . . The American economy is not threatened by old-fashioned inflation.

Romney said this is shown because "we don't have too much money chasing too few goods," which is the classic picture of inflation.

Instead, the nation is witnessing today a wage-price spiral based on three factors:

. . . **Compensatory theory** of the New Deal—or tax and tax in good times and spend and spend in bad times.

. . . **A labor monopoly** which is pushing wage scales above productivity and resulting in business having to raise prices to recoup costs.

. . . **Excessive reliance** by a big government on monetary controls which are started and stopped in such a way to confuse and confound business interests.

All this has created today's real big threat: big labor, big business, and big government.

Too successful . . . Romney also had a word of advice for businessmen and politicians when he said:

"The most vulnerable thing in the world is entrenched success."

As example of what he meant he cited present popularity of the small car. Romney asserted that industry can't stay out of step with its market no matter how successful it has been in the past. He said the big-three auto makers have done just that, and the result is the presence of a market place for the small cars.

He warned the same situation exists in world politics where Russia and this country are struggling for dominance. Russia has elected to challenge this country on its most successful point—industrial production. The Soviets vow they will outdo Americans for world markets as well as win the minds of the masses on the political battle front.

This nation's strategy, he said, should be to keep an economy where the consumer is always the boss and a political system where the invidual always has control.

API Board Picks Four Vice Presidents

• Officers amend bylaws to make finance and accounting post elective. Two top officers and a vice president renamed.

THE FOUR new API vice presidents are:

L. E. Fitzjarrald, manager of the production department, Phillips Petroleum Co., Bartlesville, Okla., API vice president for production. He succeeds D. L. Connelly, of Warren Petroleum Corp., Houston.

Clarence H. Thayer, vice president of Sun Oil Co., Philadelphia, API vice president for refining. He succeeds H. W. Ferguson, of Humble Oil & Refining Co., Houston.

C. J. Guzzo, vice president for marketing, domestic, Gulf Oil Corp., Pittsburgh, API vice president for marketing. He succeeds Dwight T. Colley, of Atlantic Refining Co., Philadelphia.

W. J. Arnold, assistant vice president in charge of accounting for Pure Oil Co., Chicago, API vice president for finance and accounting. He is the first man elected to this post which previously was filled by appointment.

H. S. M. Burns, president of Shell Oil Co., New York, was reelected API board chairman; and Frank M. Porter, president of Fain-Porter Drilling Co., Oklahoma City, was renamed API president.

Other reelected officers were C. E. Spahr, president of Standard Oil Co. (Ohio), Cleveland, vice president for transportation; P. C. Spencer, board chairman of Sinclair Oil Corp., New York, treasurer; and Willard M. Wilson, of the API staff, New York, secretary.

Here's a closer look at the new vice presidents:

Division of Production

L. E. Fitzjarrald

THE BIG, strapping 6-footer-plus who was elected API vice president of the Production Division looks about as unlike a bookkeeper and stenographer as anyone could.

But, that's how L. E. Fitzjarrald broke into the oil business 44 years ago. September will mark his fortieth year with Phillips Petroleum Co.

A native of Elk City, Kan., Fitzjarrald got his early education in Kansas and Colorado and then went to Fredonia Business College. His first job, in 1914, was as bookkeeper-stenographer for an independent oil man in Cushing.

Looking back on it today, Fitzjarrald remembers his first boss as a man who "made more money and drilled fewer wells than anyone in the oil business."

When he was a 3-year veteran in the business, Fitzjarrald went to work in the materials department of the old Empire Gas & Fuel Co. in Kansas and was sent to the company's offices in Bartlesville in 1919. That same year he switched to Phillips and has never left.

The materials department in those days was an integral part of the production department and the onetime bookkeeper started up through the ranks, learning production on the way.

He was named assistant to the general superintendent, supervisor of the company's partnership operations, general superintendent of production, and then in June 1951 he became manager of Phillips' production department. That's the job he holds today.

Aside from his new duties heading up API's production division, Fitzjarrald's primary interest is in conservation. This is almost a religion with him as it is with the other production men who started the grass roots oil-industry conservation forum a few weeks ago.

Fitzjarrald is sold on the movement, but even he's a little amazed at the spontaneous reaction to the forum. It convinces him even more that their approach is the right one.

He's a member of the group's steering committee and chairman of the subcommittee appointed to study oil laws, rules and methods of state agencies in Kansas and Oklahoma. Five of these regional subcommittees plan to make studies and then recommend improvements.

Division of Marketing

WHEN THE new marketing vice president of the API talks about his job, he sounds like a member of the public-affairs committee.

Charles J. Guzzo, Gulf Oil's domestic marketing vice president, thinks better public relations is a prime function of his division of the API and that marketers can do more than anyone else in the industry to create public good will.

"When we have pleased the public, we'll have done our job," the marketing veteran says matter of factly.

Because marketers, primarily dealers, have the principal contact with the public, he thinks they have a greater responsibility than other oil men to do a good public-relations job.

The rest of the industry's governmental problems will be solved easily once that dealer-public relationship is a good one, Guzzo believes. He regards the API Division of Marketing as a sounding board for marketers and a vehicle for speaking out and getting to the core of industry problems.

The job of creating good public will is far from the only serious problem in marketing, and stocky, swarthy, greying Guzzo is well experienced in all of them. He has 44 years of dealing with them behind him.

Guzzo went to work for Gulf as a clerk in the com-

to Direct Work

Charles J. Guzzo

pany's Alexandria, La., bulk plant in 1914. He hasn't been out of oil marketing since. He served as Gulf's local agent in cities in Louisiana, Arkansas, Mississippi, and Tennessee before stepping up to state-wide manager for Tennessee. Then he moved to New Orleans as assistant division manager in charge of automotive sales.

He became general manager of the New Orleans division, which covers six states, in 1949 and stayed in that job until he was elected a Gulf vice president 4 years ago and moved to Pittsburgh.

Guzzo looks at successful marketing as a ladder leading from a successful dealer to a successful jobber to a successful supplier. The trick is to maintain this success relationship at the lowest possible cost.

Division of Refining

CLARENCE H. THAYER, the API's new vice president for refining, has been around the oil business for a long time. But he's been a good customer of petroleum products for even longer.

Now vice president in charge of manufacturing for Sun Oil Co., he can trace his interest in gasoline back to a 12 hp. Krohn that he bought for $100 over 40 years ago. With new disc wheels and a body which he built and painted a bright orange, he burned up the roads around Richmond, Calif., at a reckless 45 mph.

Only seven Krohns were ever produced, so rarity of ownership required a certain amount of skill at improvisation. Carrying his repair kit in the back, he poured babbitt bearings on the spot as they burned out; and once substituted a handy fence post for a broken leaf spring. He even patched a gaping hole in the engine block, left one morning by a departing connecting rod.

Times have changed, Thayer concedes. He had been driving a new car for 6 weeks recently before he discovered that he didn't know how to get the hood up.

Office boy . . . Following his schooling, Thayer spent a couple of years in a furniture factory before he entered the oil business.

In 1914 he joined Standard Oil Co. of California as office boy, progressing to shipping clerk, blueprint boy, and draftsman before enlisting in World War. I.

With 18 months of foreign service in the Engineering Corps behind him, he returned to California Standard to hold down the jobs of chief draftsman, project engineer and assistant superintendent of maintenance.

Sun hired him in August 1926 as an engineer. Following 7 years' experience in supervising pressure stills, he became assistant to Arthur E. Pew, Jr. who was then vice president for manufacturing.

Then he became chief engineer of the manufacturing department and was elected to the board of directors in March, 1941. He has held his present post since March, 1947, when he succeeded Arthur Pew.

Thayer brings to his API post a combination of "know-how" and "want-to." That he has been in the middle of the octane race, all of his API colleagues will readily agree. It isn't over yet, either. He notes that talk of the gas turbine taking over the passenger car field has given way to some doubts that it ever will. The race should slow down a bit from now on, he feels, as automotive and oil engineers wrestle with rumble and other problems.

Demand looks up . . . He looks forward to the coming year which should see U. S. crude capacity rise more slowly than product demand, to reduce the surplus refining potential to a more realistic figure.

One of Thayer's pet projects today is improving the efficiency of refineries. In the old days, management

Clarence H. Thayer

could set aside a certain per cent of net profit each year for plant replacement. This, plus average amortization program permitted replacement of processing units about every 7 years. Today, taxes, inflation, and longer depreciation periods make it practically impossible to replace capacity as fast as it becomes obsolete.

Thayer has one answer to this dilemma: Automation. Sun is now under way on a long-term program to improve process efficiency, raise product quality, and reduce labor costs through this means. It will be done over a sufficient

period to avoid layoffs. The program has been placed in the hands of a task force of engineers invested with great responsibility and authority.

He feels that management must awaken to this great need for improving efficiency, if the refining industry is to remain modern and competitive. The only other recourse is outside borrowing, or dilution of equity.

Division of Finance and Accounting

W. J. Arnold

THE NEW API vice president of the Finance and Accounting Division is a man whose zest for industry service has not been dimmed by 15 years of activity.

He is W. J. Arnold, assistant vice president in charge of accounting and controller for Pure Oil Co., Chicago.

Describing himself as "just a bookkeeper," Arnold is a native Chicagoan who attended Northwestern University, became a certified public accountant, and after several years in this field, joined Pure as an auditor in 1934.

He was Oil Industry Information Committee chairman of the Great Lakes region committee and was awarded an "OIIC certificate of appreciation" during the 31st annual API meeting for his public-relations services to the petroleum industry. He is also Illinois chairman of the natural gas and oil resources committee.

Arnold was vice chairman of the general committee, responsible for the API finance and accounting program, before becoming the first person elected a vice president of the division. Previous heads of the 3-year-old division, which functioned only as a committee before, were appointed.

Relation at work . . . Arnold's lively discussion of the oil industry in general and his sphere of responsibility reflects strongly his public-relations service.

For he needs no selling on the oil business, his own job, or the API. In fact, he gives much credit to the API for the fact that finance and accounting in the oil industry is on a much sounder basis than in many industries.

"Before, we had no opportunities to know others who were our counterparts and exchange information on common problems and concepts," he explains. This is the chief purpose of committee work—and Arnold is a good example of what the serious convention-goer does. He arrived at the headquarters hotel Sunday and had been busy day and night when a reporter finally caught up with him Wednesday morning.

But if his enthusiasm was dampened, you couldn't tell it.

Asked what his hobbies were, he replied, "my job, along with church and school work," which comes as little surprise after you've talked with him a while. Arnold is the chairman of the divinity school at the University of Chicago.

Dangers of Inflation

. . . cited by Milton Friedman. Cures can be worse than the disease, he tells finance and accounting group session.

MODERATION and almost impossible foresight are required if the steps we take to combat the ups and downs in our economy are to be less dangerous than inflation or recession, themselves.

Economic controls reside only in the government. To ask business to take voluntary action is passing the buck.

Government controls must be monetary in nature, through the FRB. Price and wage controls lead down the road toward collectivism.

What's needed is a long-range set of rules calling for a gradual, fairly fixed rate of money growth, to be substituted for the fluctuations taken to offset inflation or recession.

These views and others were aired by Milton Friedman, professor of economics, University of Chicago.

Tolerance needed . . . There are bound to be some variations in our economic climate, he said. They are inevitable in a human society.

But what is needed is a tolerance for these ups and downs. We should accept them without being panicked into taking measures which take effect too late and tend to overcompensate.

If tightening up, or loosening up on money exerted an immediate effect on our economy, this would be the logical means to level out the ups and downs.

But such measures, sound as they may be, take 12 to 16 months, on the average, to become effective. They can be effective in 3 months, or 2 years. No one can predict this rate.

Therefore, concluded Friedman, the incipient inflation or recession can well be on its way toward recovery by the time the corrective action takes effect. Then overcompensation takes hold and the pendulum tends to swing too far in the opposite direction.

Single policy . . . The FRB, he feels, should be given a firm pattern to follow. It should adhere to a steady policy of increasing available money at a certain rate each year as our economy grows.

The day-to-day approach to monetary control is bad enough. Going beyond it to price and wage controls is much more dangerous. What we need is more tolerance to take these ups and downs in stride.

"If there had been less attempt to counter cyclical action, then there would have been less cyclical action to counter."

Lyle C. Wilson, left, API Chairman H. S. M. Burns, and Louis B. Seltzer at the API session which heard . . .

Oil Has a Lousy Reputation, API Told

• It's not likely to get any better, either, until top men in oil companies take their public-relations functions more seriously, news men tell oil men. More, and stronger, attacks against oil are on the way in Washington.

SEVERAL THOUSAND of the nation's top oil men sat attentively in a big Chicago auditorium last week and heard themselves called "arrogant" and "stupid." Few, if any of them, flinched perceptibly.

The verbal lambasting came from two of the country's top news editors, Lyle C. Wilson, a vice president of United Press International and manager of its Washington bureau, and Louis B. Seltzer, the peppery little editor of the big healthy Cleveland Press.

Neither told the oil men much that was new or startling, but they had been invited to tell the industry what's wrong with its public relations.

What they had to say wasn't pretty, but it also had a familiar ring. Most oil men are becoming well aware of the fact that they don't find many sympathetic ears in either the halls of Congress or on main street.

Oil in worst shape . . . Wilson, the more specific of the two, said flatly that oil is in "the doghouse," but he warned that the industry can't feel exclusive about its dubious honor.

All industry is taking a beating in Washington. The oil industry, he said, is in worse shape for the simple reason it has never effectively told its story to Congress.

"You think you're being kicked around," he commented. "What you may not realize fully is that politicians generally think the oil industry is overprivileged and pretty arrogant about it."

Wilson described oil as "marked in the public mind as an industry muscle-bound with money."

"Your successes are too well known," he said crisply, "and your failures are too little known."

This leaves a public impression that every well drilled is a producer and everyone in the industry is rolling in money. Public relations is the only way to combat these impressions and the oil industry has the worst public relations in all industry.

Public-relations chaos . . . Wilson pointedly said he wasn't talking about public-relations departments of oil companies or associations.

"It's up to your top people," he said. "If any of you have public-relations departments that aren't answering to the top man in your company, you've got the wrong setup."

He described oil's public relations as "chaos, with a complete lack of orderliness, and complete failure to communicate."

Referring to oil's future in Washington, Wilson warned, "The left wing is going to move in on you" and added:

"The left wing of American politics plays harder than you are likely to fight them."

Country hurt too . . . Seltzer was a little more general in his comments than Wilson, but he voiced the same warnings.

The Ohio editor castigated industry in general for its lack of militant interest in public affairs and said the oil industry was no exception.

Seltzer said the failure of oil to sell itself to the public was hurting the country as much or more than it is the industry itself. He warned that the "shift to the left" is a "critical challenge to our democratic society in this century."

"You have been stupid,, arrogant, and unmindful of the consequences of your behavior," he said.

Too many businessmen, including oil men, are too concerned with their own immediate problems and are indifferent to the problems of the country as a whole in its most dangerous era," he said.

Reserves to Double in Next 20 Years

• Another 70 billion barrels of primary reserves alone will be added to the 30 billion now proved, Morgan Davis tells API. Industry, he says, is partly to blame for running-out-of-oil talk; it's too conservative in its estimates.

MORGAN DAVIS took sharp issue last week with what he called a "premature preparation of an obituary" for the domestic oil industry.

We're not only not running out of oil, the Humble president told API registrants, we're on the way to finding more than twice as much oil in the next 20 years as we now have in proven reserves.

The domestic industry, he said, will add another 70 billion barrels of oil in that period. There is very little allowance in that figure for improved techniques which will actually add much more to the U. S. supply.

At the same time he suggested that the industry itself is largely to blame for public fears that we're running out of oil. The fault, he says, is the industry's ultraconservative method of estimating and reporting this country's oil reserves.

Humble's president expressed some surprise that a note of alarm about U. S. oil availability comes now "when domestic production is restricted so far below capacity by lack of markets." He estimated that U. S. fields today can produce 3,000,000 bbl. daily more than is needed domestically.

Availability . . . Davis described the current availability of oil a matter of prime public interest now just as it has been for years.

Repeated National Petroleum Council studies since 1947 have all indicated that the supply from domestic wells increases faster than domestic demand. The latest study reported an ability to produce 9,867,000 bbl. daily. This was in January 1957. Davis says it's now safe to say that there is at least 10,000,000 bbl. daily available. October's estimated output was only 7,000,000 bbl. daily.

He pointed out that the council's studies aren't guesses but are competent engineering studies of individual wells and fields.

He said he's surprised that some oil companies have questioned the council's estimates when "their own engineers" had a part in them.

The U. S. can count on having at least 10,000,000 bbl. daily of productive capacity for years unless there is a drastic cutback in exploration and drilling. Davis says.

He believes this capacity is even more significant because domestic oil demand won't increase more than 3% a year in the future. To boost that increase more, Davis says, oil will have to cut into markets now held by coal with a price advantage.

Low estimates . . . Contrasted with estimates of coal reserves, oil reserves reported officially give the public a "bare minimum estimate of oil economically recoverable through existing facilities."

"Those of us who have worked on reserve estimates know from experience that the actual production from known fields will exceed the presently reported estimates by a substantial margin," Davis says flatly.

He questions whether this reserve policy of the industry "best serves the public interest." Oil could also speak of vast potential resources if it adopted the coal formula for estimating reserves.

Davis points out that oil reserve estimates, "ably prepared" by the API's petroleum reserves committee, are restricted to "proved" reserves.

"These are reserves recoverable at present prices with presently known technology through wells and facilities in operation, although technically, the estimates include a small increment of undrilled proved reserves.

"Furthermore, the ground rules do not allow the estimation of effect on a field of secondary recovery and pressure maintenance by fluid injection until the facilities are installed and results demonstrated."

Davis estimates that today's reserves probably average only about one-third of the oil in place in fields already discovered.

Future supplies . . . Davis takes a

SERVICE AWARD for outstanding fundamental research work in the oil industry is given Lloyd Elkins, right, by Monroe E. Spaght, chairman of the research committee of the API board of directors.

Elkins is manager of production research for Pan American, Tulsa. Spaght is executive vice president of Shell in New York.

Similar ceremonies were held many times during the API convention to honor 52 oil men as recipients of the honor (OGJ, Nov. 10, p. 86).

dim view of all efforts to estimate ultimate production of oil in the U. S. He can cite numerous studies in the past which were outdated, outproduced, and outmoded shortly after they were made.

"Where policy decisions in the public interest are concerned we would be far better advised to take a critical look at what we can see ahead within a reasonable period of 10 to 20 years," he said.

If demand increases at the rate of a little more than 3% each year for the next 10 years, the U. S. industry will produce just about 30 billion barrels of oil—just about what proved reserves are today.

This means, Davis says, another 31 to 36 billion barrels must be added by discoveries, extensions, and revisions in the same period. This he points out is just about the same amount added during the past 10 years.

Drilling today is at about the average level of the 1948-57 period. It follows, Davis says, that the goal in new additions is "easily attainable." The only factors which could alter this would be a continued decline in drilling or a sharp drop in new reserves developed per well.

Under the reserve committee's rules, most of the next 10 years' new oil will come from extensions and revisions. New fields are given relatively minor credit immediately after discovery. There have been so many new fields discovered, revisions of those initial estimates plus improved technology in older fields may add 20 to 25 billion barrels in 10 years.

Referring to new reservoir techniques, Davis added, "If these new methods work only half as well in practice as in the laboratory, the industry will see surprising results in recovery."

Davis says flatly there is no truth in the idea that all the large fields have already been found in the U.S. He says there have just been more small fields found than in the past.

"The increasing number of small fields has been in addition to rather than in lieu of large fields," he said.

Reasonable prices? . . . Finally, Davis takes issue with what he calls a "misconception" about the rate of increase in the cost of domestic oil in recent years.

He says the effect of improved technology in offsetting inflation is being overlooked. And, the assumption that all exploration, drilling, and producing costs are related to crude is wrong. These costs also should be related to natural gas and natural gas liquids that they yield.

H. S. M. BURNS, API board chairman, talks with Kerryn King, CPA chairman.

CPA Outlines Three-Pronged Program

API's newly formed Committee on Public Affairs is gearing for a threefold effort next year.

First on the agenda is the celebration of oil's centennial. In this, CPA will act in the role of coordinator service unit, rather than central organizer.

Oil companies, associations and local groups of oil men will be offered brochures and plan books to help them organize their own centennial efforts.

Posters, exhibits, school material, displays and other aids will be available to oil companies so that they can carry the ball on their own. A new version of the Drake film, narrated by John Daly, will be released.

Continuing in its role as a service unit, CPA will carry out its second goal with a program of meeting critical attacks levelled against the oil industry with prompt, accurate rebuttals. This service will be available to the autonomous state units.

The third phase of CPA's program for 1959 concerns government relations. In this, the organization will help the industry present its case on such issues as depletion, government control and taxes.

Pipeliners Elect Tulsan to Top Post

J. MARSTON LINEHAN, vice president of Sunray Mid-Continent Oil Co., Tulsa, was elected president of the Pipe Liners Club at the thirteenth annual API banquet.

He succeeds Ralph K. Paine, pipeline manager for Standard of California.

Harry Mooreland, president of Great Lakes Pipeline, was elected vice president. John W. Emison, president of Texas Pipe Line, was named to the board of governors, and Earl W. Unruh, president of Sinclair Pipe Line, was elected to the membership committee. (See photos, pages 330-31).

The club at its annual meeting paid tribute to its first president and organizer, Burt E. Hull, who died November 7 in Dallas (See p. 141).

J. M. Linehan

Oil's Demand to Climb Through 1975

• Economist sees big growth at home and "astounding expansion" abroad to keep up with population, energy needs. Rising trend in demand to return next year.

THE NEXT 17 YEARS will see a dynamic increase in demand for petroleum products, and therein lies a future filled with opportunities for the oil industry.

This forecast of trends in the industry from now through 1975 was given by Austin Cadle at a session of the committee on petroleum statistics. Cadle is manager of the economics department of Standard Oil Co. of California.

Cadle confidently declared there is nothing on the horizon that can destroy oil's promise as an outstanding growth industry. This is true, he said, in foreign areas as well as in this country.

The California economist refused to buy any pessimism. He said demands have by no means reached a saturation point in the U. S. petroleum industry and added that the future pattern in underdeveloped areas of the world is one of astounding expansion.

For the oil industry, this will mean a growing need for huge development of crude-oil production and for the building of transportation, refining, and marketing facilities.

What about 1959? . . . The oil industry next year should see demand for its products return to a rising trend.

Cadle explained that about mid-1957 U. S. petroleum demand ended several years of expansion, remained on a plateau, but now is beginning to climb again. This will continue through 1975.

Next year should see domestic demand rise by 4% or better.

Demand for gasoline should match this 4% gain, but jet fuels will enjoy an 11% increase. Even distillates and residual fuel oil should gain, too, despite competition from natural gas.

In the Free World area, total demand next year will increase by approximately 11% with western Europe showing the greatest potential.

Basis for gains . . . Cadle explained that petroleum markets are made by people, and his predictions are based solidly on expected population growth trends and expanded energy requirements.

He declared that:

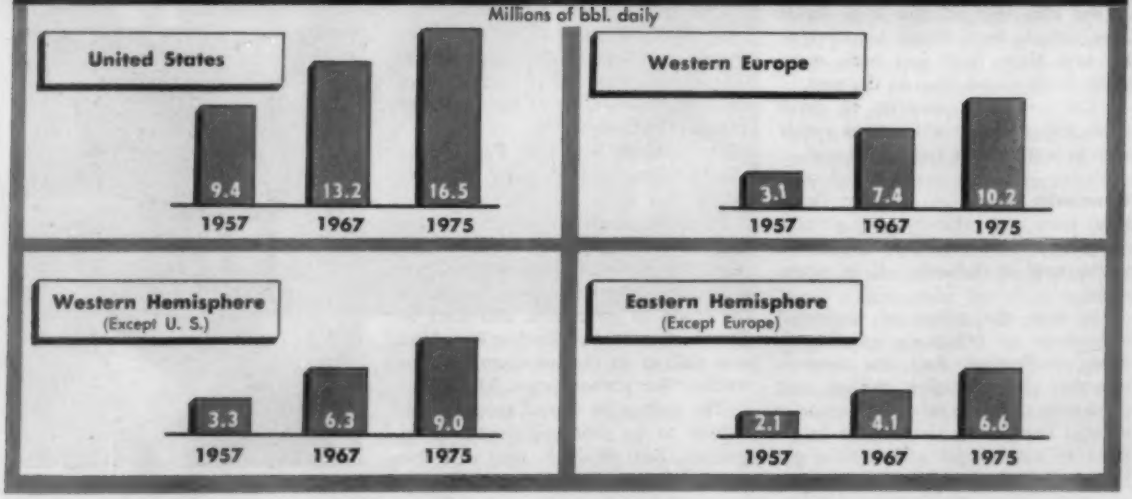
. . . Population in the Free World will increase about 30% to more than two billion by 1975. By then there will be 227 million people in the U. S., a growth of 33%. The Western Hemisphere outside the United States will enjoy a 50% growth and the Eastern Hemisphere a 31% gain.

. . . Energy required to serve the needs of this growing world population will practically double, reaching the staggering figure of 75 million barrels daily in oil equivalent. And petroleum will supply 50% of this energy.

In every area except the United States, petroleum will increase its share of energy requirements. The United

Austin Cadle
. . . can't find room for pessimism.

How Refining Capacity Must Grow to Meet Demand



How Product Demand Will Change by 1975

	Demand Increase Million b/d	Demand Increase %	Gasoline %	Distillates %	Fuel Oil %
United States	6.7	76	100	47	46
Western Europe	6.3	229	178	234	259
W. Hemisphere (except U. S.)	4.0	174	195	182	135
E. Hemisphere (except W. Europe)	4.3	214	214	226	202
Free World	21.3	134	...	...	...

States will show a 2% drop. This, however, does not mean that domestic demand for petroleum will sag. It merely means that use of gas will increase at a faster rate than will oil. Oil demand in the United States will increase 6.7 million barrels daily, a 76% jump during the period.

In the Free World, petroleum will show a 9% gain in its share of the energy market; demand will jump 134% to 21.3 million barrels daily.

Domestic demand . . . Cadle predicted that gasoline demand in the United States will grow 100% from now to 1975, distillates 47%, and fuel oil 46%.

Here is the individual product picture:

. . . Gasoline and jet fuel by 1975 will exceed 50% of the total domestic consumption of petroleum products. Factors behind this growth are a larger population, multicar families, shorter working hours, and longer vacations—all tending to boost travel by motor vehicles.

. . . Distillates will take about 16% of the domestic petroleum market by 1975. Chief growth factors are expanded construction and road-building activity, more dieselized railroads, and some growth in heating-oil markets.

. . . Fuel-oil demand will grow to 2.2 million barrels daily in 17 years and by that time will represent 14% of the market. Fuel oil probably will suffer the greatest competition from alternate sources of energy, particularly natural gas.

Over-all product demands in foreign areas are increasing at treble the rate in the United States, Cadle said, with the greatest increases being shown in western Europe.

Back of these demand growths are increasing air travel in Canada, Latin America, and Europe, increasing use of oil as a spacc-heating and boiler fuel in western Europe, and the tremendous latent possibilities in the entire Eastern Hemisphere.

Effect on refiners . . . The next 17 years should see a continued expansion in world refinery construction to supply the petroleum products indicated by the above demand estimates.

This means specifically that refinery capacity must expand 136% to about 42 million barrels daily. And this will require a new fixed investment charge of more than $20 billion current dollars or about $1 billion annually.

Add to this the need for terminal storage facilities, marketing outlets, and crude and product transport, and future investment needs are great.

Cadle estimated that U. S. refinery capacity will have to be increased about 76% or from 9.4 million barrels daily to 16.5 million barrels daily. The rest of this hemisphere will have nearly to triple its capacity.

Refiners also will face a need to shift yield patterns to meet product demands in the future. These patterns in the United States, Canada, and Latin America show a growing emphasis on light products and declining fuel oil. Exceptions are Caribbean refiners, who will continue to supply a large part of fuel-oil requirements of North America and Europe.

Emphasis in Europe will be greatest on the black oils, with probably some downgrading of current yield patterns, Cadle said. Pattern of yields required in the rest of the Eastern Hemisphere shows very little change.

Economist Has Big Role in Oil

OIL MANAGEMENT is learning to rely more and more on the talents of the economist in directing its business affairs.

Robert G. Dunlop, president of Sun Oil Co., gave this analysis of the economist's role in the oil industry in a talk before the API committee on petroleum statistics.

Dunlop said the economist is charged with a twofold responsibility: A service function of forecasting all sorts of business trends, and an advisory function in providing economic background information to management.

As a staff advisor, the oil economist is becoming management's right-hand man by:

. . . Forecasting future business trends and conditions.

Dunlop said it's more dangerous not to forecast than to guess wrong once in a while. Management in planning for the future must have some guidance.

. . . Helping guide product policy by market research.

The fate of the buggy-whip manufacturer is an example of the dangers of being ignorant about future market trends. Every thinking management must make sure it discontinues making buggy whips long before the industry succumbs.

. . . Advising on capital appropriations.

The economist's role here is to provide management with facts on the over-all financial merits for every request for capital spending coming from operations people. It's impossible for management to meet every request, and data from the economist is essential in picking the best bets.

Robert G. Dunlop
. . . management needs guidance.

. . . Giving scientific approach in determining size of the advertising and promotional budget.

. . . Providing the political and economic background to guide management in making foreign operation policy. This is important as the oil industry becomes more global in its operations.

FPC Needs Producers' Help on Costs

• Agency is required to consider costs in checking prices, but its method of determining costs is useless, API is told. Producers must refute the FPC method and offer something better, accounting firm official says.

IT'S up to producers to show the Government how to determine the cost of gas.

That's the conclusion of Stanley P. Porter, Tulsa, member of the accounting firm of Arthur Young & Co.

Porter told the finance and accounting session of the API his recommendations were based on the books of 17 companies which together supply 32% of the direct sales of natural gas to interstate pipelines.

It is impossible to determine the cost of discovering and producing gas, and it would be impractical to base prices on cost even if cost could be determined, Porter said.

Nevertheless, FPC is required by law to use cost as at least one factor in setting reasonable prices, and is now engaged in trying to settle on acceptable methods.

The FPC staff, supported by many intervenor distributing companies, claims it has a method. But this method, according to Porter, is useless for pricing purposes. Therefore it is imperative that producers refute this method and offer something better.

The problem . . . Since 80% of the cost of gas must be split among gas, oil, and natural-gas liquids, the biggest accounting job is allocation.

There is no uniform method of doing this, and none is needed or desirable, Porter said.

Each company should select the methods best suited to its individual conditions, but, he warned, the principles must all be the same, the methods must be logical and suited to the purpose, and they must reflect the general condition and practice of the industry.

He further warned against using a method which gives one producer a temporary advantage in a particular case, because it may be used against this producer or others in later cases. Each case becomes a precedent and affects all other cases, he explained.

Value concept poor . . . Porter attacked what he called the value concept, or sales-realization method, advocated by the FPC staff.

This divides joint costs on the basis of the value received from sale of the different products. This is false, he said, because:

Stanley P. Porter
. . . suit method to individual case.

. . . It would base price on a determination of cost derived from existing prices, and thus is reasoning in a circle.

. . . It would perpetuate the historic condition of depressed gas prices.

. . . If the price of oil should go down, the "cost" of gas would automatically go up.

. . . FPC would in effect be regulating the price of crude and of gas liquids.

A better way . . . The method recommended to producers should fall within what Porter called the "benefits-received" concept of cost accounting.

This is a measure of the use of cost, or a division based on the reasons why a facility was built and the total cost incurred. It allocates cost to individual products on the basis of how much each has benefited by the process.

Such methods won't give the exact cost of discovering, producing, and processing gas, Porter said, and they probably will produce cost figures substantially above most prevailing field prices. But they will come closest to giving FPC a workable tool. The industry should then provide FPC with other factors to be considered along with the cost data in settling reasonable prices.

Other problems . . . Porter took up two of the most perplexing problems —condensate fields and exploration costs—and outlined the stand he feels the entire industry should take on them.

In a condensate field with a plant separating large quantities of liquids from a rich-gas stream, the cost of the facilities cannot be associated with any particular product, he pointed out.

Each part of the stream benefits equally from the gathering and separating process. Therefore, a common denominator is required, and this might be volume, molecular weight, or energy content.

Porter urged producers to take a strong stand in favor of the energy basis saying that it gives a truer picture and is more nearly in harmony with industry practices.

The most complicated problem of all is determining exploration costs, because of the nature of the exploration process, Porter stressed.

Successful wildcats can be capitalized, but failures can't be anticipated and can't be related to any successful lease nor identified as to gas or oil costs.

Porter's solution to this is for each company to include all its own exploration costs which are identifiable with the reserve under consideration, and then add an industry-wide factor for costs which cannot be identified with that reserve.

The reason for this, he explained, is that each producer's exploration program is influenced by the successes or failures of the rest of the industry so that all costs of discovery do not lie within the company making the discovery.

Wildcats may be drilled, or leases surrendered, on the basis of the dry-hole records or geological work of other companies. To try to base the "cost" of gas on the exploration expenditures of a single company in discovering a single field would lead

SUNDAY MORNING at the Conrad Hilton registration desk, the lines were long. Although many oil men arrived days in advance to take part in committee meetings, the big flood of oil men poured into Chicago on Sunday. Major division meetings began Monday morning.

to fantastic variations in prices, he pointed out.

Typical data . . . To illustrate his method, Porter cited his analysis of 17 big gas companies.

He found that for the industry as a whole during the period between 1952 and 1955, 80% of all real wildcats were dry, one-quarter of the successful wildcats found gas, and 30% of the successful wildcat drilling footage resulted in gas discoveries.

There is a close correlation here, and if the industry as a whole had reduced its exploratory expenditures in that period, fewer gas reservoirs would have been discovered.

By using industry-wide experience, Porter applied an accounting formula which showed that 28% of a typical producer's exploratory costs should be allocated to the cost of discovering gas, and the remainder allocated to oil.

On this basis it cost 14.17 cents per M.c.f. to find the new gas reserves discovered during 1957, Porter said.

Costs above prices . . . Porter warned again that any logical cost-accounting method will show that the cost of gas is far above present market prices.

But, he stressed, producers should insist on using sound costing methods. It then will become apparent to the FPC and all others concerned that cost is not the proper basis for setting gas prices but that cost figures can be used as one of many guides in arriving at reasonable prices which will satisfy legal requirements.

Active Politics Urged

. . . for industry by a GE executive. He points up need for businessmen to take greater role in governmental affairs.

THE OIL INDUSTRY got a do-it-yourself political kit last week from one of the nation's topflight business executives who warned that management's biggest failure is in politics.

L. R. Boulware, General Electric vice president, told the industry's purchasing agents they may have only 6 weeks—between now and the new session of Congress—to start reversing this failure.

Boulware said the new Congress will be made up "by and large" of good citizens eager to do the right thing. But, he added, they are going to be under great pressure to do some things not in the public interest. The job of business is to convince them it is "good politics" back home to resist the pressure.

Boulware warned that the something-for-nothing trend has grown so great with respect to what the public expects from the government, it is also infecting the public view of business. The most successful political operators today, he said, are those who are promoting the ideologies of inflation and the concentration of power in Washington.

Boulware advised his listeners to tackle two different kinds of political work—party and nonpartisan.

He believes party work on a personal basis is even less important than basic nonpartisan political work of an educational nature. The whole idea is to educate the public so that both political parties will have to have good candidates and platforms.

Do-it-yourself program . . . Boulware had his own outline of what business and businessmen can adopt for their own plan of action. His points:

. . . Management, preferably the top man, should inform every manager at every level that effective political activity both internally and externally is part of his job.

. . . A "Better Business" program should be started internally in every company with heavy emphasis on the basics of our business society and why the system is the best for the public as well as the company.

. . . Spread the program to the entire local community, once it is effectively under way in the company.

. . . Follow Washington issues and go to work on your representatives to take a something-for-something stand on measures like deficit spending, taxes, labor laws, federal subsidies, concentration of taxing, spending, and power in the Federal Government.

. . . Get busy in party politics on your personal time and money.

Flexibility No Refining Problem Today

• Refiners can handle any ups and downs in product demand, but they must plan ahead and anticipate shifts in yield patterns in order to make their changes economically, Humble's Ferguson tells refining session.

YIELDS of both gasoline and distillate fuel can be varied a full 10% of crude charged to stills at today's level of refinery operations.

But the individual refiner still must look two ways at once in using his flexibility logically, H. W. Ferguson, vice president of Humble, told the Division of Refining.

The refiner, he said, must correctly assess his own needs to supply the market, and he must also keep an eye on economic trends in the industry.

H. W. FERGUSON . . . a refiner must learn to juggle.

Basic rules . . . Ferguson said the refining industry over the years has proved it can handle shifting yield trends.

The refining industry made the shift from kerosine to gasoline required by the motor age. It has shifted to improve quality in the octane race. It has shifted to make room for the growing importance of petrochemicals. And it constantly is shifting to adjust for vagaries in the weather.

The big question, however, still is anticipating the trends so the shifts can be made smoothly and economically.

Basic premises should always be kept in mind in meeting season shifts. Ferguson said these basics include:

. . . Nature of demand. Distillates are much more affected by the weather than gasoline.

But it's too expensive to build sufficient refining capacity to supply distillate demand in winter from current production. So it's necessary to store distillates in summer in order to meet part of the winter demand from inventory.

. . . Growth. Winter distillate demand currently is growing at such a pace that increasingly high inventories of the product must be built up during summer.

. . . Limits within which a refiner can economically shift gasoline and distillate yields. The spread between these yields grows narrower and becomes smaller as capacity is approached.

. . . Role of the weather. Severity of winter weather sets the crude runs necessary to meet distillate demand. Production of gasoline thus also becomes dependent on the weather and not on needs of the current market.

This means that a refiner's inventory position on gasoline at the end of the winter depends on how much gasoline he was carrying at the start of winter.

. . . Inventory strategy. From the viewpoint of idle capital tied up in unneeded inventory, it's to the refiner's advantage to enter the winter season with a minimum gasoline inventory.

How Refiners Can Vary Yields

Crude Runs:					
% of Capacity	100	95	90	85	80
Gasoline:					
Upper Limit	51.0	52.5	53.7	54.7	55.5
Lower Limit	43.3	44.3	44.7	44.7	44.7
Distillate:					
Upper Limit	28.2	28.4	28.4	28.4	28.4
Lower Limit	21.3	20.0	19.0	18.3	17.6

Three plans . . . The refiner has three methods at his disposal for meeting variable demands for his products. He can:

. . . Vary his crude runs.

. . . Vary the yields of products from crude.

. . . Make use of seasonal storage.

The variation in refining crude runs can be used over a wide range, Ferguson said. The top limit, of course, is capacity operation and the lower limit is fixed by plant economics.

During the postwar years, crude runs figured as a per cent of capacity have range from 93.7% in 1951 to a low of 84.4% this year. On a quarterly basis during the last 3 years, the maximum average has reached 94.5% of crude capacity and the low has gone to 81.4%.

Varying yields of crude, meanwhile, also has added flexibility to refinery operations, but this method is limited in scope, Ferguson said.

By taking into account the components obtainable from average crude when processed through average refinery equipment, it is possible to calculate the theoretical maximum yield variations at various percents of capacity.

The results show that gasoline yields range from a low of 43% of the crude processed to a high of 55% and distillate yields range from 17% to 28% when crude runs to stills range from 80 to 100% of capacity.

Seasonal storage provides one of the best methods of coping with demand variations. Seasonal drawdowns of inventories used by the industry as a whole during the postwar period have varied from 20 to 52 million barrels of gasoline and from 32 to 100 million barrels of distillate.

Careful individual attention to end-of-season inventories could result in improved utilization of seasonal storage capacity and would probably increase industry total to some 56 million barrels of gasoline and 106 million barrels of distillate.

This would be about 6.3% of summer gasoline demand and 28% of winter distillate demand.

Ferguson said the two best methods to meet variations in demand are the maximum withdrawals from seasonal storage and diversion of low-octane gasoline fractions to middle distillates.

What about the future? . . . Ferguson said Humble recently made a study to get the answer to this question.

The study involved a statistical analysis of the supply and demand situation for gasoline and distillates as it has historically existed in this country. Calculations were made to arrive at the maximum variations in demand.

The result of the Humble study, Ferguson said, indicated that the refining industry can meet future variations in demand with only a small variation from an optimum use of seasonal storage.

Trends in Pipelining

. . . hold attention of pipeliners at API meeting. What's new is of interest, but what's ahead is more important.

AUTOMATION, metering, and corrosion control were top subjects among pipeliners in committee meetings and corridor conversations at the annual API meeting.

Two surveys reported to registrants were of particular interest:

One shows that 20% of all stations on crude-oil pipelines are remotely controlled and 36% of all product-pipeline stations are remotely controlled. Average horsepower at satellite stations is 1,200.

The other survey indicates wide acceptance of a proposed specification for use of communication channels for telemetering and control. Both operating and equipment companies reported an almost universal willingness to use the API Bulletin as a guide if it is adopted.

Pipeliners heard the 24-in. Laurel Pipe Line cited as an example of the ultramodern pipeline system. Laurel, the largest-diameter products line ever built, is being completed from Philadelphia to Cleveland and has control features found on no other pipeline.

Metering . . . Between Baton Rouge and Corpus Christi, 1,000,000 bbl. of crude is being transferred daily from pipelines to refineries by positive-displacement meters.

These statistics reveal the tremendous increase in metering. Crude oil is being transferred on a similar scale in other areas. The p.d. meter is described as capable of handling all liquid hydrocarbons. Moreover, it is now being used increasingly for calibrating tanks—especially those coated with wax.

A 16-in. p.d. meter on a test at Baton Rouge has measured 65,000,000 bbl. of crude and 30,000,000 bbl. of products and is still working well. A meter of this type to handle 20,000 bbl. per hour—double the rate of the 16-in. meter—would cost $35,000.

Excellent results are reported with a new turbine- type meter on products lines. One man per shift can be saved. A counter brings figures to the operator at the control console.

A committee has been set up to investigate custody transfer with this type of meter.

Corrosion . . . A comprehensive survey to compile coating-performance data now lacking in the industry may be undertaken soon.

Pipeline officials indicate a desire for the survey, which would cover all major pipelines dating back to 1940. What corrosion engineers want is coating history of pipelines and how the coatings have held up.

Hydraulics and computers . . . Computers have revolutionized hydraulics investigations.

Numerous design alternatives now may be investigated which before were impractical because of their cost and the time required.

A computer program also has been set up to handle data from a joint API-AGA committee studying two-phase flow, a subject which has become critical with construction of offshore pipelines to move both liquids and gas to shore for separation.

The two formulas most widely accepted for designing two-phase pipelines will be checked out on the computer against all data available from several companies.

This study will further determine the validity of the formulas, which will solve one of the trickiest design problems facing engineers in years.

CENTRAL COMMITTEE on Pipeline Transportation hears a report from Virgil Sittel, Service Pipe Line, Tulsa. Seated at the table, left to right, are Ralph K. Paine, Standard of California, government regulations section; D. F. Sears, Shell Pipe Line, operating section; James E. Moss, API director of the Division of Transportation; and R. H. Lynch, Atlantic Pipe Line, coordinating committee chairman.

To Help Profits, Cut Costs Sharply

• McCollum tells API present economic outlook in the oil industry calls for cutting out unnecessary drilling, improving exploratory techniques, increasing recovery, and expanding research efforts.

IT'S getting tougher to earn a satisfactory return on new investments in domestic oil.

L. F. McCollum, president of Continent Oil Co., cited this impending economic trouble when speaking to the Division of Production.

"It's high time we moved aggressively and courageously to meet the situation," he said flatly.

McCollum said the problem is more than setting up sound programs in individual companies. Much missionary work will be needed to get contractors, well-service men, royalty owners, and state and federal officials to understand the absolute necessity for lowering the cost of domestic oil.

L. F. McCOLLUM . . . missionary work needed on cost cutting.

The situation . . . The oil man's plight is not new. The trouble is it isn't getting any better.

Basically, his problem is a profit squeeze caused by rising costs on one hand and inability to recoup these higher costs through higher prices for oil.

McCollum said average crude-oil prices in the United States today are only 21% above the 1948 level. But finding and development costs are at least 57% higher for the same period.

The oil executive declared the oil man's price plight is caused by competition from hugh oil reserves abroad, from ample reserves in this country, and from inroads into heating-oil markets by natural gas.

In each instance, there's not too much that individual oil men can do to solve the price problem. This leaves the only line of attack possible: An imaginative program of cost reduction.

Improved drilling . . . McCollum estimates the industry's costs, including both capital and expense items, break down like this:

Finding 35%, development 45%, and lifting 20%.

This, 65% of costs are for developing and lifting, and here is where some significant cost savings are clearly attainable, he said.

"For the past several years, we have been drilling more development wells than necessary to recover oil efficiently and to meet current requirements," McCollum declared.

"This practice has contributed substantially to the upward movement in developing and lifting costs."

McCollum advocated that the excessive drilling be curtailed by:

. . . **Unitization** early in the life of fields. Progress here will require a drive to educate producers, land owners, and drilling contractors.

. . . **Proration** of production on basis of field reserves rather than a per-well basis.

. . . **Persuading state** authorities to permit use of all new production

Improved exploration . . . The surest techniques.

way to reduce oil-finding costs, naturally, is not to drill any dry holes.

McCollum admitted this particular approach is received somewhat cooly by explorers. He said nevertheless recent experience indicates exploratory-costs may be reduced through:

. . . **Devices** for improved subsurface analysis and correlation.

. . . **Improved seismic** recordings using magnetic tape.

. . . **Improved** core-drilling equipment.

. . . **Developing** new techniques for locating oil accumulations in stratigraphic traps.

McCollum emphasized the importance of stratigraphic traps.

"Only a small portion of the cubic area which is potentially oil bearing in this country has yet been tested by drilling. Much oil remains to be discovered in stratigraphic traps which can seldom be located today except by costly drilling operation," he said.

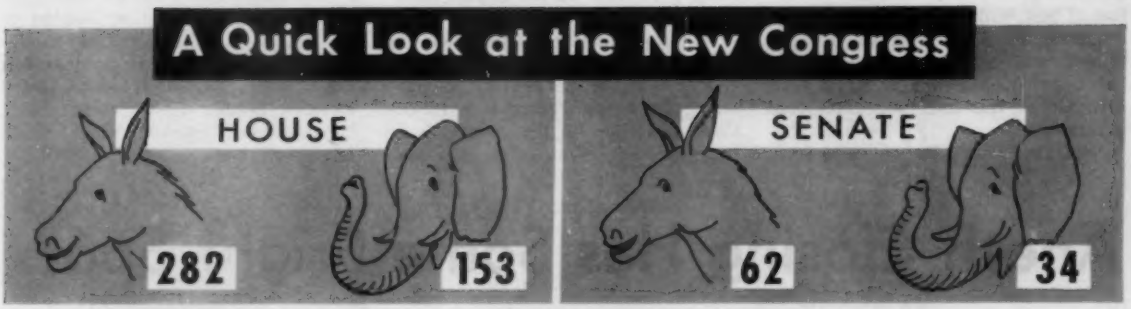
"A scientific breakthrough which would give us a means of locating these traps economically would significantly reduce our future finding costs."

Better recovery . . . At present the industry is recovering only about one-third of the oil in underground deposits.

This makes improved recovery techniques a highly important area of possible cost cutting.

McCollum reported significant progress contributing to greater recovery have been made in handling of well fracturing, water floods, gas injection, miscible floods, in situ combustion, and various other recovery innovations.

"The possibilities in this area have by no means been exhausted," he said. "They offer exciting opportunities. Just consider, for example, what would happen to our finding and developing costs per barrel if we could discover a means of doubling the average recovery from oil reserves. And even this would not bring us to the end of the road."



Major Changes on Tap in Congress

• When the new Congress meets in January, Democrats will increase their margin on all committees dealing with oil. Just what these changes will mean to oil is a moot situation, but more liberal thinking is expected.

MAJOR CHANGES will be made in January in the makeup of the congressional committees concerned with oil and gas.

It is generally accepted that the new Congress will be far less conservative than the one now dying. Hence, the membership of the committees, when decided in January, will be important to the industry.

Since all measures sent to the Senate or House floor for vote must first pass the scrutiny of committees, it is here that the more liberal nature of the next Congress will first be evidenced.

There will be more Democrats and fewer Republicans on every committee having an interest in oil and gas. On some Senate committees, the present ratio of eight Democrats to seven Republicans may broaden to nine to six or even to ten to five.

While there will be broad changes in the membership of the committees, they will remain for the most part under their present chairmen. In general these are conservative Democrats, the majority of them southerners, who have had long law-making experience and will be able to sidetrack many of the wilder bills that are expected to be offered next year.

Interior affairs . . . The one exception in the committees dealing with oil is House interior affairs. Rep. Wayne N. Aspinall (Colo.) will succeed Rep. Clair Engle (Calif.) as chairman.

The main oil interest of Engle, who was elected to the Senate, lay in curbing Defense Department withdrawals of oil lands for military purposes. Aspinall's oil interest lies in the development of shale oil of which his state would become a major producer.

The changes important to industry will come in the ranking Republican members of the committees. How broad these will be is indicated by the washing out, by retirement or defeat, of the top minority members of 14 committees.

The significance of these changes is that they will bring to the top, in some instances, members of the "new" Republican school, less conservative than the men they will succeed.

Four top groups . . . Top membership on four of the groups handling oil matters will remain unchanged. These are the House armed services and tax-writing ways and means committees and the Senate armed services and judiciary committees.

One of the most extensive shifts in Republican membership will be in the House interstate-commerce committee.

The first, second, and fourth-ranking members—Wolverton (N. J.), O'Hara (Minn.), and Heselton (Mass.)—have retired. The third-ranking man, Hale (Maine) and two other members, Beamer (Ind.) and Carrigg (Pa.) failed of reelection.

This will elevate Rep. John B. Bennett (Mich.) to the position of top minority member. In the past, Bennett has opposed bills aimed against federal regulation of the natural-gas industry.

The new party lineup of Congress also will change the political balance of the committee. Now 18 Democrats and 15 Republicans, it may become 22 and 11.

Even more changes will take place in the ways and means committee, which controls the tax rates paid by industry. There will be at least seven vacancies to be filled. But Rep. Daniel A. Reed (N. Y.), a friend of the oil industry, will remain in the spot he has held for some years as ranking minority member.

Other changes . . . Here is the line on some other House committees:

Merchant Marine, which deals with tankers and shipping, will be unchanged with Rep. Thor C. Tollefson (Wash.) in the top Republican spot.

Retirement of Ralph W. Gwinn (N. Y.) will put Carroll D. Kearns (Pa.) in ranking position on the labor committee.

Rep. Kenneth B. Keating (N. Y.) won election to the Senate, paving the way for Rep. William M. McCulloch (Ohio) to lead the Republicans on the judiciary committee.

Equally significant changes will occur on the Senate side of the Capitol:

Retirement of Sen. Edward Martin (Pa.) will make Sen. John J. Williams (Del.) top Republican member. Williams is a leader in the move to cut the oil industry's depletion rate—but he has adherents from the Democratic side of the committee as well as his own.

Sen. Barry Goldwater (Ariz.), now fourth in rank on the minority side,

will leap to the top on the labor committee as a result of the retirement of Sens. H. Alexander Smith (N. J.) and Irving M. Ives (N. Y.) and the defeat of Sen. William A. Purtell (Conn.).

Defeat of Sen. John W. Bricker (Ohio) will make Sen. Andrew F. Schoeppel (Kans.) ranking Republican member of the interstate commerce committee.

With the two top Republicans, Sens. George W. Malone (Nev.) and Arthur V. Watkins (Utah) out of the picture, Sen. Harry Dworshak (Idaho) will get ranking position on the interior committee.

In the public-works committee, the retirement of Martin also makes for a change, with the seat next to the chairman going to Sen. Francis Case (S. D.). Case was one of the principals in the "incident" of an offer of a campaign contribution by an oil man which led to veto of the Harris gas bill by President Eisenhower in 1956.

Top Republican posts on other Senate committees having an interest in oil matters are unaffected: Styles Bridges (N. H.) on appropriations; Leverett Saltonstall (Mass.), armed services; Homer E. Capehart (Ind.), banking; and Alexander Wiley (Wis.), foreign relations and judiciary.

Aneth Closing Has Some Bright Spots

• Shutdown of almost 300 wells gives operators time to run bottom-hole pressure tests. Quick approval by FPC is predicted to pave way for connecting wells to El Paso pipeline.

THE FEDERAL government clamped a lid on the biggest field in the Four Corners area last week—but it isn't as tight as it might seem.

All but about 30 of the 327 Aneth wells affected by the federal order were shut in to prevent flaring of about 65 million cubic feet of gas daily. How long they will remain shut down hinges on Federal Power Commission approval of sale of the gas to El Paso Natural Gas Co.

The shutdown order by Secretary of the Interior Seaton covered 327 of the 357 producible wells in the Aneth area. The action cut off about 90,000 bbl. of the estimated 100,000 bbl. daily crude production in the area.

The U. S. Geological Survey, charged with carrying out Secretary Seaton's order, permitted "not more than 30" of the wells to continue production. The exceptions were made where the natural gas was being used to supply drilling rigs or for lease camp fuel and where wells offset state leases not covered by the order.

Also a victim of the shutdown was Texas New Mexico Pipe Line, one of two crude pipelines serving the Aneth area. An official of Texas New Mexico said the line will be closed down for the duration of the Aneth shutdown. Four Corners Pipe Line moves crude from both Aneth and Bisti field, which is in the northwest corner of New Mexico.

Here's the bright side of the picture:

... **Operators were taking** advantage of the shutdown to run bottom-hole pressure tests so wells will be ready for connection to a pipeline.

... **With the wells shut down,** pressure over the field will equalize and operators can get some idea of the area's reserves.

... **The FPC is expected** to issue El Paso Natural a temporary permit within a short time to buy the Aneth gas.

... **El Paso is ready** to start taking the gas now and could be taking most of the load—between 40 and 50 million cubic feet—by December 15.

FPC action ... A short shutdown was predicted by one pipeline official close to the situation. He told the Journal he "wouldn't be surprised" if the FPC granted El Paso the permit within a week.

And Ed Thomasson, deputy supervisor of oil and gas for the southwestern region of the USGS at Roswell, N. M., said, "We anticipate the shutdown order won't remain in effect too long."

In Washington, the Federal Power Commission at weekend was expected to speed reopening the field.

The commission had before it applications from most of the Aneth producers for temporary certificates to permit the sale of gas to a pipeline. Temporary permits would permit the producers to start immediate gas deliveries while leaving the price of the gas to be decided by the FPC later.

The FPC, meanwhile, rejected a staff motion which might have brought a long delay in reopening the field and indicated it will speed its decision on the price to be paid for the gas.

The FPC staff had urged the dismissal of all applications for permits to sell Aneth gas to El Paso. It contended that the 16 producers involved had failed to supply data asked last August to permit a ruling in the case. The motion was referred to an FPC examiner for disposition. However, the commission said, the evidence "should be given consideration in passing upon any challenge of the adequacy of the showing made by these applicants."

To streamline procedure in the matter, the FPC severed one of El Paso's applications from the consolidated case in which it was included. The FPC pointed out that the issues involved in the two El Paso applications "differ in several material respects" and that it can more readily dispose of the proposed gas sales under the streamlined procedure.

The shutdown ... The order closing the Aneth wells was prompted by a request by the Navajo Indians (OGJ, Nov. 10, p. 88).

Most of the wells in the area are on Indian and federal lands, which produce the bulk of Utah's crude. About 2,000 bbl. daily of the production in the state is from state leases, and about 250 bbl. daily is from private leases. Neither private nor state leases are covered by the order.

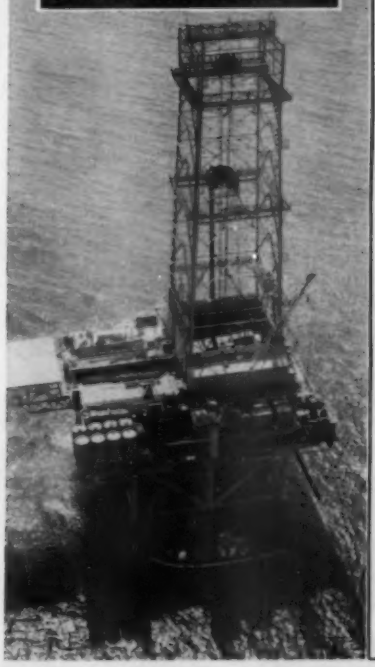
Thomasson said a few of the wells on federal land exempted from the order adjoined state leases. This was done to prevent drainage from wells on federal land.

He said the USGS let The Texas Co. produce some wells (with about 4,000 to 5,000-bbl. production) which offset two state leases. Based on August production figures, the Utah Oil and Gas Conservation Commission estimates Texaco produces about 31% of Utah's crude.

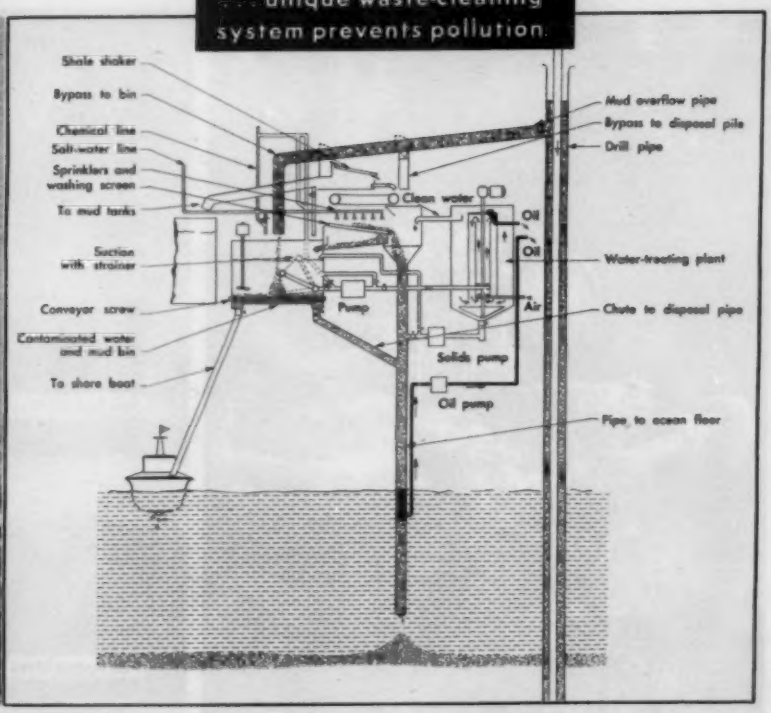
Some other companies and their estimated percentage of Utah crude production are Shell, 14%; Superior, 12%; California Standard, 10%; Continental, 8%; Carter, 8%; Phillips, 6%; Pure, 2%; and Three States, 2%.

Tex Mex transports crude from Aneth, while Four Corners serves Aneth and Bisti. During August, Tex Mex moved 68,400 bbl. daily from Aneth into Texas. Four Corners moved 40,822 bbl. daily from Aneth and Bisti to Los Angeles.

Multiwell platform drills first test and . . .



. . . unique waste-cleaning system prevents pollution



New Device Prevents Ocean Pollution

• California Standard's platform is built to collect and treat contaminated water. Mud and cuttings are washed and treated before being dumped.

THE MOST COMPREHENSIVE waste cleanup system ever used on a drilling platform is in operation about 2 miles off the coast of Summerland, Calif.

No spilled oil or water, or any other waste, is allowed to escape into the ocean from the $2-million platform built by Standard Oil Co. of California and Humble Oil & Refining Co. last summer.

Instead of ruining fishing, as sportsmen had feared before the area was opened for exploration, the drilling operation is actually attracting fish.

How it works . . . Cuttings and drilling mud, after being cleaned in a unique washing system, are dumped on the ocean floor. The disposal is being done at the request of the fish and game commission, which wants to see what effect this will have on marine life.

All decks of the platform are built so they slope outward from the center. Gutters around the edges collect any contaminated water and start it toward a treating plant capable of handling 1,000 bbl. of water daily.

In an air-flotation cell, the oil content of the water is reduced to 10 p.p.m. Pollution rules permit the content to be as high as 50 p.p.m.

The cuttings and mud first are cleaned in the plant shown in drawing (above). After being separated in the shale shaker, the cuttings drop onto a conveyor belt.

If the cuttings are not contaminated, the belt dumps them directly down the disposal pipe. Usually, however, the conveyor dumps them onto a screen where they are sprayed with salt water. Oil emulsion-breaking chemicals are added when needed. The clean cuttings then are dumped down the disposal pipe.

If the cuttings are from an oil sand, or they are badly contaminated for any other reason, the conveyor also can dump them directly into the contaminated mud bin. There a conveyor screw moves them to a chute which deposits them in a service boat for hauling to shore.

Before the 110-ft. square structure was erected, fish and game commission divers studied the 100-ft. waters and classed them as fish "desert." The ocean floor was barren of plant life and other food which attracts fish.

Now, fish like to lie in the shadow of the platform or hide in the kelp accumulating on its legs. They are also attracted by the clean cuttings and mud deposited on the ocean floor.

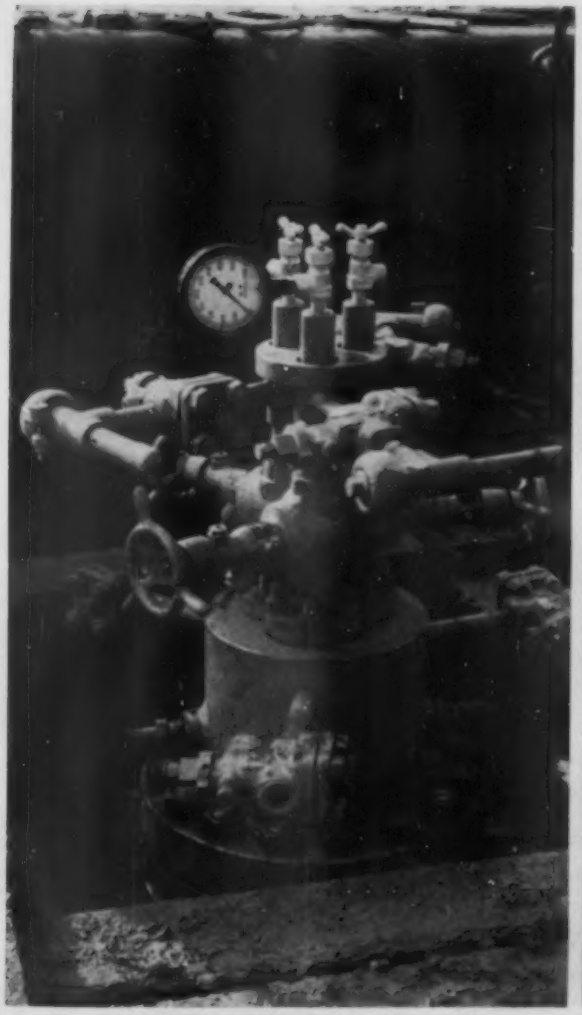
California Standard was nearing projected total depth of the first well last week. If it is successful, as many as 25 wells will be drilled from the platform.

Airport to Get Products Lines

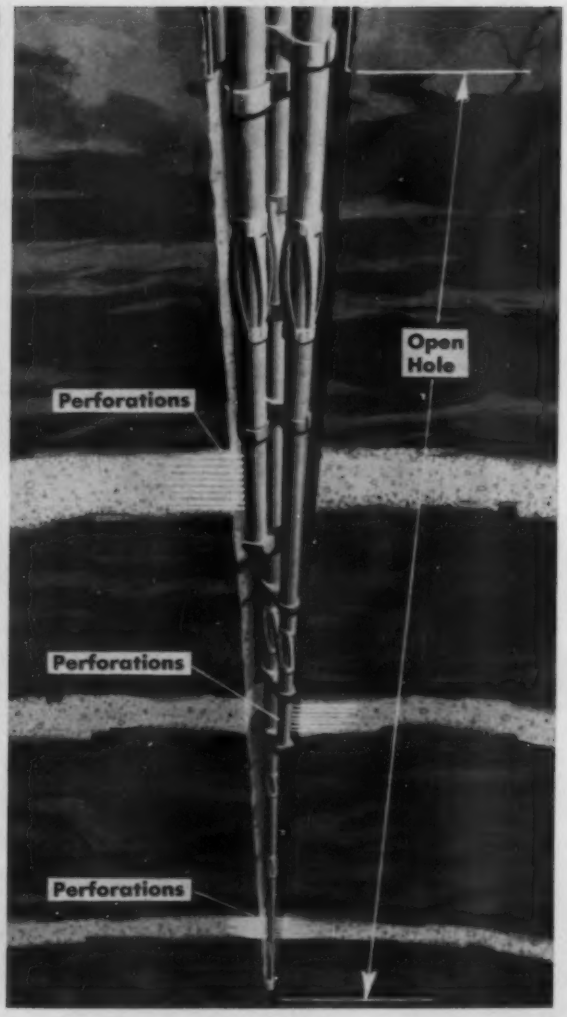
HUMBLE Pipe Line Co. expects to start supplying aviation gasoline and jet fuel in early December through two 4-in. pipelines to Love Field, the Dallas municipal airport.

Humble's own crews are building the 5-mile lines from the company's North Texas Terminal at Irving to the Love Field facilities of Allied Aviation Fueling Co., which dispenses fuels at the airport.

The new lines will permit continuous flow of aviation gasoline and jet fuel from Humble Oil & Refining Co.'s Baytown refinery and will assure delivery of uncontaminated products to the field. Both internal and external coatings are being used. The internal coating is an epoxy type manufactured by Humble.



ON the surface, and . . .



DOWN the hole.

Humble Has New Completion Method

• Casing serves as tubing, and unique perforator is used in multiple, tubingless completions. Cost-saving method eliminates the entire oil string and tubing packers of conventional multiple completions.

THE OIL INDUSTRY last week got a look at Humble Oil & Refining Co.'s "multiple, tubingless completions."

The company now has five such wells in the Raccoon Bend field of Austin County, Texas. There are three triples and two duals.

In these wells, two or three strings of small-diameter pipe hang side-by-side, cemented in the open hole. There is no single large-diameter oil string as in conventional completions. So, in effect, each of the small-diameter strings is a separate well. While all strings are suspended from a common casinghead, there is no downhole flow path from one to the other. That is, you cannot pump down one string and circulate back up another. But, by the same token, there should be no communication possible between producing zones.

Humble claims this radical new completion method makes big savings in cost. It does away with the entire oil string and tubing packers of a conventional multiple completion. Very little, if any, additional rig time is required to make the tubingless dual or triple.

At Raccoon Bend, Humble says the tubingless triples cost only one-half as much as three conventional wells. The duals cost about 60% as much as two conventional wells.

Casing is tubing . . . Humble calls the completions "multiple, tubingless."

Actually, the small-diameter strings are the same size (2⅞-in. o.d.) as often used for production tubing in conventional wells. However, since these small-diameter strings are cemented in the hole, they are, in fact, casing. Since no other pipe is used inside these strings, they are also the tubing. No other tubing is needed.

The company has applied for patents on the features of the new method and equipment which it considers novel.

Key is perforator . . . Most of the mechanics of the method are old.

The thing that unlocked the door to making the new completion practical is a unique perforator. As the illustrations show, it would be dangerous to perforate one of the upper sands with a standard perforating gun. The common perforator has no means of "aiming." It might shoot holes through the other parallel strings as well as the string through which it was run.

So, Humble developed a perforator with built-in aiming "sights." This perforator points its shots so that they shoot holes through only the string in which the perforator is run. The upper tubing strings carry a narrow "track" inside along the length to be perforated. The "track" indexes the perforator so that it points in a safe direction.

Of course, the position of the "track" itself must be fixed in relation to the other pipe strings. For that reason, all strings are strapped together and run simultaneously.

Humble engineers and others who have worked on the multiple, parallel, tubingless completion say the Raccoon Bend wells are not the "ultimate." They would like to be able to run each of the strings independently of the other as in conventional multiple completions in cased holes.

Both injection, production . . . In its first four tubingless completions, Humble has a total of five injection wells and five oil-producing wells in four bore holes. Depths range from 1,800 to 3,800 ft.

At present, all zones producing are flowing. Later the wells will need artificial lift. In preparation for this—and in anticipation of sand-production problems—Humble has run 1¼-in. tubing in the producing strings.

The Raccoon Bend wells also carry new-design wellheads. These permit working on one of the casing strings without disturbing the others. Humble says the compactness of the tree (only 28 in. between wing valve and bradenhead) will make it possible to use multiple pumping units to lift the oil.

What of workovers? Humble says it answered this question several years ago when it developed the permanent-type completion. PTC tools are now available to do any kind of remedial operation through small-diameter strings. Most is done with wireline tools; the rest, with macaroni strings.

Only big casing is surface . . . The tubingless wells are being drilled to expand a water flood.

Humble knew there were small, lenticular zones above the flood zone which appeared productive. However, they would not be economical to drill over the entire field. But, by going to the multiple, tubingless completion, Humble is getting to produce the upper sand lenses at little additional cost.

Humble sets 9⅝-in. surface casing to 1,100 ft. and drills an 8¾-in. hole to total depth where the cluster of casing strings is strapped together and run.

A poor cement job is about the only possible reason that one zone in a well would be in communication with another. For this reason, each of the strings carries centralizers. Regular 2⅞-in. guide shoes and fill-up collars are also used. A modified cement is pumped down the longest string and displaced to the surface.

Run and rerun . . . More preparation is needed to handle multiple casing strings simultaneously.

All components of the casing strings are measured and numbered to determine their running sequence before work starts. Each string is made up in that sequence and run independently into the hole. Then, it is pulled and racked in the derrick in doubles. One or more of the strings is run completely to bottom during this process to condition mud.

Racking in doubles allows the bundle to be clamped and run faster than if the tubing had to be picked up, single at a time. Humble says that 10,000 ft. of the 2⅞-in. casing was made up and run in 5 hours on the fourth well.

Dual slips hold the pipe in the rotary table as additional doubles are added. Single elevators are used to lower the string into the hole. The longest string is used as the tension string to carry the entire weight on all strings in the single elevators.

Dual rams are installed in the blowout preventers when the second string commences. When the third string commences, the collars of the third string are spaced about 15 ft. below the collars on the other two strings. In this way, only two strings are in the blowout-preventers during the majority of the time casing is being run.

The doubles of the tension string are picked up with the elevators. The catline picks up the doubles of the parasite strings. About 20 ft. up in the derrick, power tongs are installed to make up the strings. These are operated from a casing-stabbing board.

Wild-Well Job Nears Climax

. . . off Louisiana. CATC moves to choke off uncontrolled flow with fast-drilled relief wells. Last fires put out.

BARRING unforeseen difficulty, three offshore drilling rigs will pierce the producing formations of CATC's wild wells, and operators will inject salt water and possibly sand and cement to choke off the uncontrolled production.

The plan moved according to schedule last week when Zapata Offshore's Vinegarroon reached total depth of 6,607 ft. and began setting pipe. Glasscock's Mr. Gus II, drilling below 8,646 ft., and Kerr-McGee's Rig 46, drilling below 8,213 ft., were nearing their depth goals.

The operators planned to have the killing operation under full steam this week.

On the surface, fire fighters extinguished the two fires on CATC's No. 5 and No. 7 wells by pumping water on them.

Wells blowing . . . Last week, the No. 5 and No. 7 wells were still blowing sand, salt water, oil, and gas.

There was similar blowing from leaks in the flanges of the No. 2 and No. 6 wells. The No. 3 was blowing periodically. The No. 1 and No. 4 were dead.

Operators were uncertain whether they could continue to allow the No. 5 and No. 7 to blow. If the weather and wind direction were wrong, the wells might have to be ignited again to prevent dangerous accumulation of gas and oil.

CATC also was preparing to get back into production with other wells in Block 30 field, located in Louisiana's West Delta area. Production of some 5,000 bbl. of crude per day was cut off when the explosion and fire occurred October 15 (OGJ, Oct. 20, p. 59, and Oct. 27, p. 43).

Gathering lines which had converged at the destroyed 45-E platform have now been reworked to form a new pipeline juncture on a newly erected platform 1,500 ft. to the northwest.

Texas Gas Prices Jumped

. . . in West Central region by Lone Star. The 3-cent an M.c.f. increase will be followed by others in later years.

OPERATORS in Texas District 7-B, pinched for months by low oil allowables, crude-price cuts, and climbing costs, now have a better long-range price outlook for their gas.

Lone Star Gas Co., the only major buyer in the area, has increased prices for both dry and casinghead gas on long-term contract. New schedules mean:

. . . **Low-pressure gas** will sell for 10 cents an M.c.f. instead of 7 cents.

. . . **High-pressure gas** with maximum of 500 psi. will sell for 13 cents an M.c.f., up from 10 cents.

Escalators . . . Furthermore, West Central Texas gas producers are assured further price increases down the road.

Gas prices in the area will go up another 2 cents an M.c.f. on January 1, 1964. One-cent hikes are scheduled for January 1, 1969,, and January 1, 1974.

The going gas prices on the latter date thus would be 14 cents an M.c.f. for low-pressure gas and 17 cents for high-pressure gas.

Long-term purchase contracts held by Lone Star in the area will be rewritten on request of the producer to reflect these changes. Also, provision for the pipeline to pay 75% of the producer's gas severance tax will be included in contracts where this is not already provided.

Lone Star's short-term purchase contracts of only 1 or 2-year duration will not be negotiated.

All the gas involved in contracts enjoying price increases moves intrastate and thus is not subject to FPC regulation.

Anniversary . . . A pilot contract reflecting the price changes already has been signed by Lone Star and Graridge Corp., independent oil firm of Breckenridge, Tex.

The news, broken to jubilant area producers generally by Lester Clark and E. Bruce Street, Graridge officials, came as somewhat of a silver anniversary gift during the West Central Texas Oil and Gas Association's annual meeting at Abilene, Tex.

Higher price spreading . . . The high West Central Texas gas prices are expected to spread to Scurry County and other fields in the Lone Star area of operations in District 8.

Higher prices, resulting from similar price hikes, have already gone into effect in North and East Texas.

The catalyst credited with starting off this chain of increases was the 13-cent an M.c.f. price negotiated by producers with Natural Gas Pipeline Co. of America, when the latter laid its new big-inch line into the Jack-Wise county area of North Texas from its main system in the Texas Panhandle.

Lone Star also buys in this area. Favored-nation clauses in its contracts with producers there forced its former area price of about 10 cents up to the 13-cent level.

Favored-nation clauses, however, did not force extension of the high North Texas price to the West Central Texas area.

The Lone Star move will cost the company about $1,265,985 annually, Lone Star told the Journal last week in its first official comment on the price development.

Crude price switches . . . A rash of price changes hit crude producers in several sections last week.

Buyers posting changes included:

. . . **Sunray Mid-Continent** restored 7 cents a barrel to the price of Oklahoma sweet crude. A $3.08 top was posted for 40°-40.9° gravity with a 2-cent downward differential to 36° gravity and a 3-cent differential below that.

. . . **Sohio** cut 7 cents a barrel from its Oklahoma posting, making new top $3.08 with a straight 2-cent downward differential.

. . . **Champlin** raised its Oklahoma crude schedule 4 cents, still putting it 3 cents lower on all grades than Sunray.

. . . **Rock Island Oil & Refining** posted a $3.08 top for crude in Oklahoma's Love County fields with a 2-cent downward differential and a $3.05 top for crude in Pontotoc and Garvin counties.

. . . **Indiana Oil Purchasing** cut price of North Dakota crude by 20 cents a barrel.

. . . **Anderson-Prichard** and **Skelly** cut posted price for Kansas crude 10 cents a barrel to a top of $3.05.

. . . **Sun Oil** posted cuts ranging from 2 to 8 cents on low-gravity Mirando crude of Duval County, Texas, with top prices ranging from $3.13 to $3.19 a barrel.

New Drilling Methods Needed

. . . for ultradeep well of future, but Atlantic official says the 50,000-ft. hole is probable within next 17 years.

BY 1975, oil men will probably be drilling wells twice as deep as the current 25,340-ft. record holder, but not with drilling designs used today.

That's the prediction of R. O. Childers, general drilling superintendent of Atlantic Refining Co., Dallas. He says the 50,000-ft. well "is not fantastic to those who have lived in the industry—only a question of timing."

Speaking before University of Texas petroleum-engineering students at Austin in one of a series of lectures by Atlantic technicians, he said some revolutionary new drilling technique is a must.

Childers said a conventional rig big enough to go to 50,000 ft. would weigh roughly 4,000,000 lb., together with its auxiliary equipment. Mud and chemicals would weigh another 2,500,000 lb.; casing, 5,100,000 lb.; cement services, 1,000,000 lb.; and miscellaneous, another 1,000,000 lb.

With present truck load limits, moving the total of about 13,600,000 lb. would require about 345 truck trips. He estimated the investment would run about $5,185,000 before considering risk and operation.

Mechanical needs . . . Even without considering economics, formidable mechanical, chemical, and other problems would have to be solved to go that deep with conventional methods.

This would require:

. . . **Hoisting equipment** to safely move 10 miles of pipe in a single operation, with masts and structures adequate to support such weights.

. . . **Pumps which could operate** at 15,000-18,000 lb. while drilling.

. . . **Packaged power** for rig operation, possibly more than 5,000 hp.

. . . **Bits or drilling mechanism** to operate at extreme depths and temperatures, running as high as 1,000° F.

. . . **Steel sized and designed** for extreme pressures and stresses. The

steel should be sized to afford the use of drilling, completion, and lifting equipment to recover a maximum of reserves found, and designed to resist corrosion, embrittlement, pressures of more than 30,000 psi., tensile stresses greater than 210,000 psi., and collapse pressure possibly as high as 40,000 to 50,000 psi.

... **Basic coupling design** altered to withstand much greater stresses. The present coupling necessitates testing at every step of installation, causing intolerable loss of operating time.

... **Plastics or compositions** for use in packing, sealing, and conducting, capable of withstanding pressures and temperatures 50% greater than the steel used in the tools.

... **Valves capable** of withstanding 50,000 psi. working pressure that will still seal after many cycles of use.

... **Wellhead and casing supports** to hold gross loads of 3,000,000 lb. safely and contain the pressures encountered.

... **Methods and tools** to make round trips in 6 to 8 hours when necessary, plus some reasonable means of storing the huge amounts of drill pipe on a trip.

On top of these mechanical problems would come other equally tough ones, Childers said. Muds, for instance, would have to stand up under tremendous heat and pressures, and cementing materials would require fantastic-thermal tolerances.

Fire Flood Started

in Wyoming. Conoco selects small, shallow field for test.

CONTINENTAL Oil Co. has embarked on a 3-year fire-flood project in Wyoming which it hopes will revitalize a 160-acre reservoir and actually put thermal recovery on a paying basis.

The experiment is in Conoco's North Tisdale field in Johnson County. Preliminary air-injection tests already have brought an appreciable increase in oil production.

The present effort is a pilot test, and if the economics look good, the thermal drive will be used for the entire 160 acres.

The 6-year-old field has 22 producing wells. The test interval is in the Curtis member of the Chugwater formation at 900 ft. Reservoir characteristics consist of 50-ft. thickness, 24% porosity, and 20°-gravity oil.

Conoco has drilled an injection well near the center of an area bounded by five producing wells. The initial air-compressor installation consists of two 440-hp. packaged units capable of handling 1.25 M.M.s.c.f.d each.

New Import-Control Plan Due

. . . soon. Cabinet proposal is expected to give weight to historic imports. Congressional investigation hinted.

THE CABINET oil committee hopes to come up with a new import-control plan within the next 10 days.

But last weekend the committee and its advisers had reached no agreement on the formula to be submitted to the President.

There also is a chance the program may be further delayed to permit new Secretary of Commerce, Lewis L. Strauss, to study the proposals. Strauss recently succeeded Sinclair Weeks.

Interior Sec. Fred A. Seaton, another member of the cabinet committee, was in Alaska last week. He is not expected back until next week.

New controls likely will follow the present plan and the discarded "Carson proposal" in several aspects.

The committee has before it several proposals for cutting up the import pie, including a new one sent in a week ago by Pure Oil Co. Pure's plan was defined in Washington as a "middle of the road" idea.

It is more restrictive than suggested by Herbert Hoover, Jr., consultant to the State Department. And it would deal more generously with importers of less than major company stature.

Justice objects . . . It is generally expected that the new controls will give weight to historic imports.

But it is not likely that the bulk of imports will be doled out on that basis. While a 60-40 ratio has been speculated, it is possible that it will be something less.

Justice Department objections to any formula weighted too heavily in favor of the big companies are said to have influenced committee rejection of the 80-20 split reportedly proposed by Hoover.

Sen. Joseph C. O'Mahoney (D-Wyo.) intimated strongly that Hoover's 80-20 formula had been turned down because of the Justice Department's position.

Study sought . . . O'Mahoney asserted that the Hoover plan was "dead." He charged that Hoover "has been on the side of the big importing companies."

Even before the new import program was drawn up, O'Mahoney was threatening a congressional investigation of it. He said he will ask the Senate interior and insular affairs committee, of which he is a member, to "go into this whole matter."

Government officials admitted that the Hoover proposals are being refined. They indicated that thought is being given to providing quotas for all refiners who can use imported crude. This, however, would be something less than outlined in the September draft, which would have allowed imports by all refiners without regard to their ability to use the foreign oil.

Louisiana Restudies Gas Tax

. . . at special legislative session. Two-cent gathering tax may be changed to severance tax to avoid legal tieup.

THE ADMINISTRATION in Louisiana wants to suspend the new 2-cent per M.c.f. gathering tax and collect approximately the same amount by raising the 0.3-cent severance tax to 2.3 cents.

An estimated $40 million in annual state revenue is at stake.

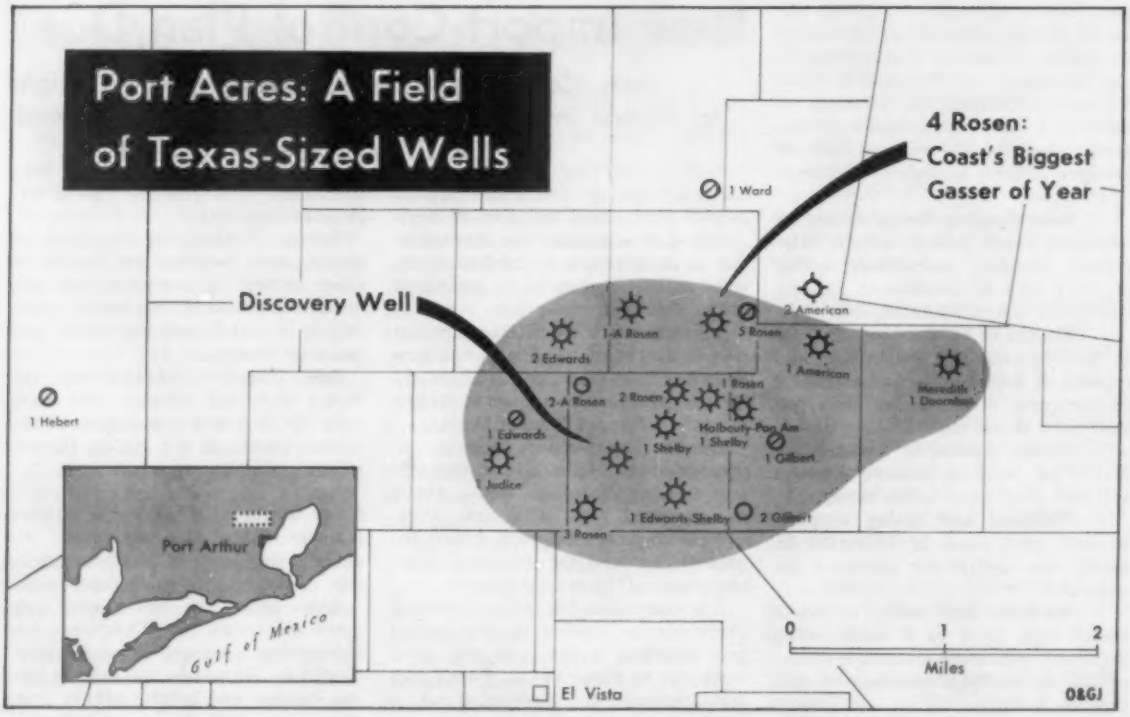
Gas interests have threatened to challenge validity of the gathering tax. A lawsuit would have tied up revenues (OGJ, Sept. 1, p. 107).

Because Louisiana is counting on the tax money immediately, Gov. Earl K. Long called the special 12-day session to write a bill he believes cannot be stopped by a lawsuit.

Actually two pieces of gas-tax legislation are in the hopper. One would raise the severance tax to 2.3 cents until August 1, 1960. The other would suspend the 2-cent gathering tax until the courts declare whether it is legal. If legal, then the tax would be collected and the severance tax would drop back to 0.3 cent immediately.

By making the levy a severance tax, Louisiana would be placing the burden of payment on the producer and royalty owner. Under the gathering tax law, the pipeline makes the payment.

Advocates of the change in the law contend that payment of the tax under either method ultimately will be the same. But among producers and royalty owners, there's considerable feeling that they—and not the pipeliners—will pay the greater portion if levy becomes a severance tax.



Big Gas Field Is Rich in Condensate

• Completion of huge gas well boosts field's rated open-flow potential to 1,044,878,000 cu. ft. daily. Total potential condensate production is now more than 65,200 bbl. daily.

A NEWLY COMPLETED, giant-sized gas well is helping prove the growing Port Acres field to be one of the Texas Gulf Coast's most prolific and condensate-rich discoveries in many years.

The new well, drilled by Michel T. Halbouty and Pan American Petroleum Corp. as joint operators, is rated as the biggest gas-condensate producing well completed in the Gulf Coast region this year.

Its open-flow capacity to produce is calculated at more than 450,000,000 cu. ft. of gas daily. Liquid recovery from the gas is 58 bbl. per 1,000,000 cu. ft. At the well's rated gas potential, the daily production would be 26,100 bbl. of 51°-gravity condensate.

Boosts potential . . . Completion of this well raises the rated open-flow potential of the field to 1,044,878,000 cu. ft. of gas per day. This averages 87,115,000 cu. ft. per day for the 12 wells completed to date.

Total potential condensate production from these wells, based on their respective liquid yields from the gas,

Port Acres Field Scoreboard

Operator and well—	Date of completion	Open-flow potential (M.c.f. gas daily)	Gas-liquid ratio (cu. ft./day)	Potential condensate yield (bbl./day)
Meredith et al.				
1 Edwards*	8-18-57	16,478	19,646	839
2 Edwards	10- 2-58	48,000	19,810	2,424
1 Edwards-Shelby	4-20-58	25,000	15,700	1,591
1 Shelby	1- 4-58	56,000	15,480	3,617
1 Doornbos†	10-25-58	10,500	31,620	332
Halbouty-Pan American				
1 Rosen	11-10-57	78,000	15,350	5,081
2 Rosen	3-11-58	192,000	25,400	7,559
3 Rosen	8- 6-58	68,000	15,000	4,550
4 Rosen	11-13-58	450,000	16,940	26,564
1-A Rosen	6- 6-58	11,400	15,700	726
1 American Nat. Bank	1-14-58	30,000	20,000	1,500
2 American Nat. Bank	9- 1-58	Dry	.....	.....
1 Shelby	4-29-58	70,000	17,900	3,910
Plumley, et al.				
1 Judice	8-26-58	(‡)	.....	.....

*Discovery well. †East extension well completed in deeper sand. ‡No gage.

is more than 65,200 bbl. daily, or an average of more than 5,400 bbl. per well. Gravities of the condensate range from 48.8° to 52°.

Two other wells in the field have had rated open-flow capacities of more than 100,000,000 cu. ft. per day. One of these is rated at 192,000,000 cu. ft. and the other at 114,000,000 cu. ft. daily. Four more have potentials above 50,000,000 cu. ft. daily.

The field is 4 miles north of Port Arthur, on the Sabine Lake coast of southeastern Jefferson County. It is less than 8 miles south of the old Spindletop salt dome field.

Only little more than a year since its discovery in August 1957, the field now stretches 3 miles from east to west and more than 1½ miles from north to south. So far there has been only one failure, a well at the far northeastern edge of the present productive area.

Production of the field, except from a newly completed east extension well, is from the Frio's deep lower Hackberry sands at depths ranging from 10,450 to 10,700 ft. The east extension well, drilled by Meredith & Co., is productive from a deeper zone, perforated at 12,060-70 ft. Completed last week, it is about a mile east and a little south of the nearest other production.

Meredith & Co. drilled the field's discovery well, 1 L. C. Edwards, located in the present southwestern part of the productive area. Meredith is drilling a wildcat 3 miles west of the field.

Builder of Inch Lines and Tapline Dies

MR. PIPELINER is dead.

Burt E. Hull, 74, the master builder of big-inch pipelines, died November 7 in Dallas. He had lived there since retirement ended a career spanning four decades with The Texas Co. He had been in ill health in recent years after suffering a stroke.

Although slight in stature, Burt Hull was a giant in the industry, and he was considered by many to be the top executive in pipelining. He served Texaco as a vice president, as president of Texas Pipe Line Co., and president of Trans-Arabian Pipe Line Co., a Texaco affiliate.

But he is best remembered as the builder of the Big Inch and Little Big Inch War Emergency Pipelines and Trans-Arabian, which were historic events in large-diameter pipelining.

Burt E. Hull

Distinguished career . . . A native of Navasota, Tex., Hull was graduated from Texas A. & M., as an engineer and in 1905 joined The Texas Co. pipeline department in its early years on the Gulf Coast.

He became chief engineer for refining. He went to Mexico during the boom and had charge of pipeline construction, the phase of company operations he entered on returning to Texas. Thus began a career in the pipeline department that led him to the top of the new pipeline company subsidiary which Texaco organized.

Burt Hull was the man the oil industry called on in 1942 to build the Inch lines to free tankers from the Gulf Coast-East Coast run for use in supplying the Normandy invasion forces. As vice president and general manager of War Emergency Pipelines, he probably showed his quiet genius more than on any other projects.

The Big Inch, from East Texas fields to the Linden, N. J., refining center, was the first crude line to use pipe as large as 24-in. Many reputable engineers voiced doubts as to its feasibility. But it was part of Hull's talent that he was quick to grasp the significance and soundness of new ideas, even when he did not originate them. And he had the knack of obtaining cooperation to carry them through.

Construction of the Big Inch, and the 20-in. Little Big Inch products line from the Gulf Coast to the East Coast, were remarkable feats in themselves. They were made more outstanding by the additional wartime obstacles and the red tape entailed in government supervision.

When the Big Inch was authorized, Hull called in the contractors and assigned spreads. They started construction without any arrangement for payment. Their only guarantee was his promise to take care of them. They received no money for several months, but weren't worried. In the end, they were taken care of.

Contractors and men on his own staff took risks with him as he slashed the red tape and sometimes ignored normal practice when it would have meant delay. It was done in the interests of early completion of the lines which helped to cut months off the European war. The only assurance of the rightness of a course was often Burt Hull's word, which was more than enough for those who knew him.

With the Inch lines completed, he left to build Trans-Arabian from Saudi Arabia's Persian Gulf fields to Sidon, Lebanon, on the Mediterranean, the first 30-in. line to transport crude oil. When Tapline was completed in 1951, Hull returned to Texas and retired from the Texaco organization, although continuing as a pipeline consultant.

Hull the executive . . . Hull was able to inspire the confidence of those around him and get them to pull together to get a job done.

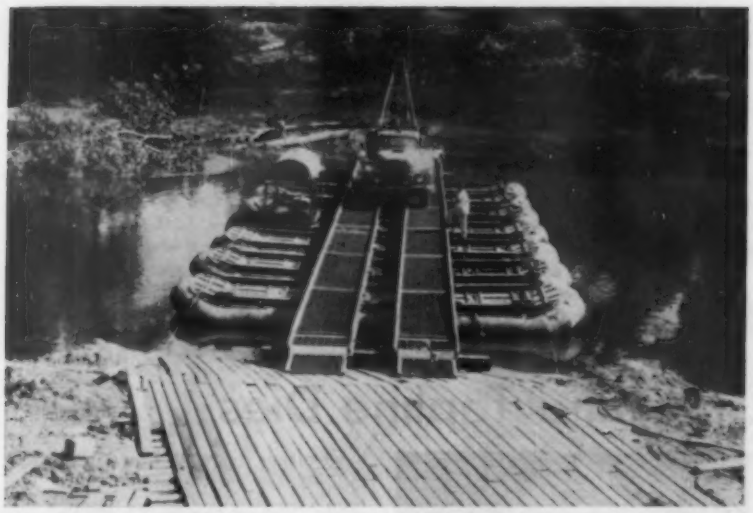
He had a way of delegating authority to a subordinate, then leaving him alone to do the job in his own way with Hull's full backing. It was results he was interested in.

He was able to win the friendship and fierce loyalty of those around him, and he operated with an open-door policy. He was always accessible to anyone with a problem or an idea.

Hull was known variously as tough, blunt, and brusque, but he had great dignity which impressed everyone but Hull himself. He had an uncompromising drive to get a job done, yet he was a warm-hearted person with infinite thoughtfulness of others. He wore prestige lightly, while being aware of it, but he was able to defy convention when ordinary methods failed.

He became known for the inconspicuous way in which he salvaged men who had failed according to general standards but who, through his help, were able to make a comeback.

Hull is being mourned this week as a sharp, clear thinker who was a great pipeliner—perhaps the greatest—and a great man.



Pontoon Ferry Hauls Oil Equipment

SHELL OIL CO. has a cost-saving method of getting trucks and equipment across the Tensas River to a drilling location in northeast Louisiana. A pontoon ferry is being used.

The ferry—similar to those used by Allied troops during World War II—hauls the equipment across the 400-ft. wide river. It eliminates the need of an expensive wooden bridge.

Shell was confronted with the problem of spanning the river when location was selected for a wildcat, 1 Ayers Land & Timber Co., Inc. The water is too shallow for equipment barges but is deep enough for small boats to navigate. Any bridge constructed would have to be high enough to allow small craft to pass under. Shell found the answer with the pontoon ferry.

The ferry is 87 ft. long. It has seven pneumatic pontoons—each with 40,000-lb. capacity — linked together with steel treadway and steel approach ramps. The ferry is powered by a 10-hp. gasoline engine operating a double drum winch which pulls the ferry across the river.

The well was completed as a discovery, flowing 111 bbl. daily of 40.2°-gravity oil through a ⅛-in. choke at 7,349-90 ft. But the ferry is still in service—hauling equipment to the site of a confirmation well, 1 Atley Donald, east of the discovery.

Big Multizone Flood Planned

OPERATORS in the big Midland Farms oil-producing area of West Texas are moving fast in a drive to unitize and set in motion a secondary-recovery plan expected to net an added 6,500,000 bbl. of oil.

An operators' application now being considered by the Texas Railroad Commission calls for unitizing 8,900 acres in the multizone Andrews County field.

Pan American Petroleum Corp., proposed unit operator, says a water flood would be started in the Wolfcamp pay at 8,400 ft. as soon as possible after the unit is approved.

Also in the unit would be the field's Fusselman and Ellenburger zones. Secondary-recovery operations, possibly gas injection, will be extended to the Fusselman later.

Pan American says 100% of the working interests in the proposed unit area and 98.5% of the royalty interests have approved the unit agreement.

The company also asked that the Ellenburger MER be raised.

Wolfcamp flood . . . The flood in the the Wolfcamp, Pan American estimates, should recover an added 5,000,000 bbl.

Pressure in this zone, discovered in December 1953, has dropped to 2,130 psi. from an original 3,500 psi. while producing 1,264,000 bbl. The reservoir is undersaturated and produces via a solution-gas drive. It has 23 completions.

Pan American intends to convert five of the wells to injection service. It will inject 650 bbl. of water daily through each. Total injection of 3,250 bbl. daily would run about twice the current oil withdrawal rate.

The Fusselman . . . This 11,900-ft. zone, found in June 1953, has produced 694,000 bbl. to September 1 this year with a pressure drop of 2,720 psi. from the original 5,100 psi.

It has 11 producing wells and, like the Wolfcamp, appears to produce via a solution-gas drive.

The Ellenburger . . . The Ellenburger, discovered in September 1952 at 12,550 ft., is the field's most prolific pay with 37 wells and output of 6,700,000 bbl. to date.

Original pressure of 5,500 psi. has declined only to about 4,880 psi. Pan American sees no need for pressure maintenance at present. The company thinks the unit could boost recovery by around 1,500,000 bbl. if the per-well MER were raised to 425 bbl. from the present 325 bbl. per producing day.

The higher production would lower pressure to nearer the saturation level. And this, in turn, Pan American says, would increase recovery by increasing the reservoir volume factor, changing viscosity of the oil, and causing expansion of the reservoir rock.

CIG Seeks Permit

to expand lines. FPC asked to approve big Utah project.

APPROVAL of Colorado Interstate Gas Co.'s proposed $91-million pipeline expansion program is sought in a new application filed with the Federal Power Commission.

Financing of the big Utah project depends on settlement of CIG rate cases which have been pending before the FPC for 5 years. W. E. Mueller, CIG president, said application was made "with the expectation that our rates will be settled by the time the FPC considers it."

Expansion plans were first announced in August in conjunction with proposals by El Paso Natural Gas Co. and Pacific Northwest Pipeline Corp. (OGJ, Aug. 11, p. 66). The project is designed to bolster gas deliveries to California and increase CIG's transmission capacity for Rocky Mountain customers.

The CIG expansion would include a large-diameter pipeline from Green River, Wyo., to Provo, Utah; 352 miles of 26, 30, and 34-in. line from the Texas Panhandle to Denver; and more than 78,000 hp. of added compressor capacity.

CIG said it will not accept any new natural-gas customers in its service area until the rate cases are settled. The company said it faces a deficiency of 50,000 M.c.f. in peak-day delivery for the 1959-60 winter season—because of insufficient transmission capacity.

Pipelines Alter Plans

. . . to serve gas markets in Middle West after rejection by FPC. Midwestern and Northern are working on joint deal to move Canadian gas into area.

LEADING COMPETITORS for large untapped gas markets in the upper Middle West are working out a possible compromise in line with suggestions by the Federal Power Commission.

Officials of at least two of the companies—Midwestern Gas Transmission Co. and Northern Natural Gas Co.—have held a series of meetings aimed at a possible joint proposal to be submitted to the FPC. The third contender, Michigan - Wisconsin Pipe Line Co., filed a scaled-down plan to replace the more ambitious proposal which was turned down by the FPC late last month.

Midwestern has disclosed revised plans for two pipelines into the upper Midwest. One would deliver U. S. supplies from its parent Tennessee Gas Transmission Co. system, and the other would bring in Canadian gas from Trans-Canada Pipe Lines, Ltd. (OGJ, Nov. 10, p. 94). The new proposal replaces the rejected plan to build a single line tied into Canadian reserves on one end and U. S. reserves on the other.

Northern's intention to file a new application was announced by John F. Merriam, company president, in a letter to the FPC. Merriam indicated the company will file one or more applications to serve the 208 communities included in its earlier plan plus other localities in the Northern Plains states.

"The new application, or applications, will rely upon Northern's gas reserves in the United States," Merriam wrote. "Consideration will, however, be given to the possibility that in the future Canadian natural gas may become available."

Talks between Northern and Midwestern may develop a plan for joint importation of Canadian gas. The companies reportedly have held several discussions on the subject.

New plan . . . The new Michigan-Wisconsin application calls for an $8,500,000 pipeline project to supply 24 Wisconsin and Michigan communities with U. S. gas.

It eliminates plans for pipeline extensions to Eau Claire and La Crosse, Wis., which were included in the company's earlier proposal. As revised, the Michigan-Wisconsin project would be approximately half as long as originally planned. The original plan, which would have cost an estimated $32,300,000, was turned down by the FPC because it was not proved economically feasible.

Michigan - Wisconsin argued that communities it seeks to serve "should not be compelled to wait indefinitely until gas becomes available from Canada."

"How long it may be before a Canadian gas supply is actually available and upon what terms is unknown; certainly there are no prospects for such a supply in the immediate future," the company stated.

However, Michigan-Wisconsin indicated it would be willing to buy Canadian gas as a supplemental source when supplies are available.

Lack of an adequate supply of Canadian gas for both domestic and export markets was the major reason cited by the FPC for rejecting the Midwestern import plan. The Borden Commission's report also weakened Midwestern's case by advocating that the Canadian Government go slow in granting export permits.

Canada's Drilling Mark Falls

TEXACO Exploration Co. has set a new record for deep drilling in Canada at its 8-28 Simonette River in Alberta.

The hole passed the 15,283-ft. mark to topple the previous record set by British American Oil Co., Ltd., at its 6-4 Lambert Creek. This well was completed last year at 15,195 ft.

Texaco is running logs at the Simonette River, which is in remote wildcatting country 28 miles southwest of Sturgeon Lake field. Whether to go to 16,500 ft. hasn't been decided yet.

Arrow Drilling Co. is contractor.

the JOURNAL *said . . .*

50 years ago

November 20, 1908

Twenty-nine wells were completed in the Gulf Coast region in the first half of November, 24 being producers with initial output of 5,225 bbl. and 5 dry.

Last winter when the oil men were before the legislature in Guthrie (Oklahoma) protesting against the gross receipts tax bill and other measures that were inimical to the oil industry. The Democratic majority under the leadership of Speaker Murray was told plainly that if the proposed bills were pressed to passage, as they finally were, the oil counties of the state would send members of some other political complexion than Democrats to the next legislature.

While this did not have the effect of staying the hand of Mr. Murray and his associates, it was not forgotten when the recent campaign was on and the results show that nearly all the oil counties have elected Republican representatives to the legislature.

25 years ago

November 16, 1933

The decision of the directors of the International Petroleum Exposition and manufacturers and distributors of petroleum equipment to hold the oil show in Tulsa next spring is being heartily approved by both the industry and exhibitors.

The International Exposition and Congress, first staged in Tulsa 10 years ago, was for several years the annual event for the oil industry and when business conditions forced its suspension during the past 3 years it was sadly missed.

Wood gas may be employed as a motor fuel in Czechoslovakia, if tests now being made in that country prove successful. One of the largest Czech iron works recently had a 3-ton truck equipped with a generator for wood gas for test purposes. Beechwood was used for the heating of the generator, and speeds from 50 to 60 kilometers on level ground were said to have been obtained.

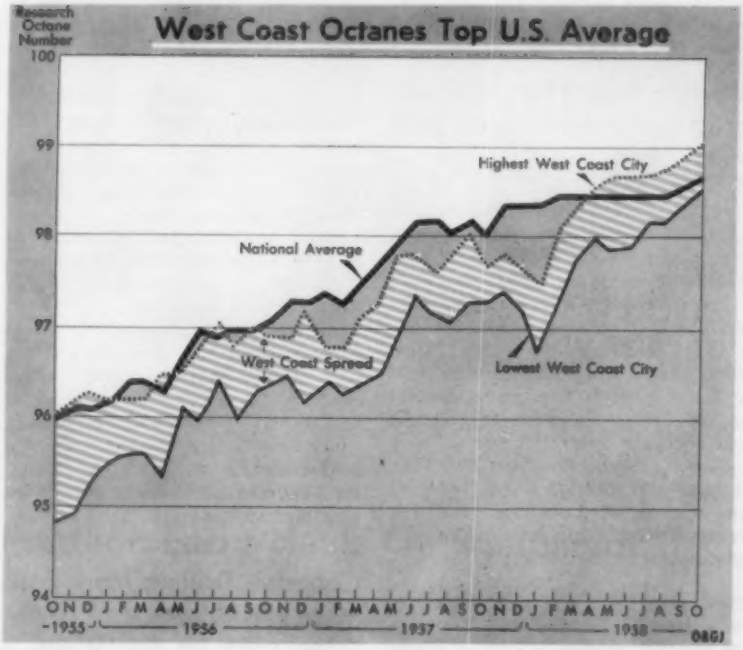
10 years ago

November 18, 1948

Orders to halt or limit production in 17 Texas oil fields accounting for one-sixth of the state's production were authorized last week by the Railroad Commission. . . Commissioner Olin Culberson said: "We have now reached the place where with increased stocks of gasoline and crude oil above ground and increased demand, Texas can fill all of the crude-oil demands made on her."

The commission charged that in the fields involved "there is being wasted 238,000,000 cu. ft. of casinghead gas daily incident to the production of 394,000 bbl. of oil per day."

The tanker situation, which was a cause of concern a year ago, appears to have worked itself out. Barring a major upset in the world petroleum industry, experts believe that transportation needs will be pretty well met over the next few years provided the major pipelines now under construction or planned in the Middle East are completed on schedule.



Gasoline Quality Takes Jump

. . . in West Coast area, while national average shows only slight boost. This is reversal of the trend in the past.

COMPETITION in motor-fuel quality has been dull so far this year —except in the region west of the Rockies.

Average quality of premium gasoline for the country as a whole increased just 0.3 of an octane since January 1, and two-thirds of that increase came in the last 2 months. The comparable increase a year ago was 0.8 octane.

On the West Coast, however, the jump this year has been from 1.2 to 2.0 full octanes in the six marketing areas sampled monthly by the Ethyl Corp. The West Coast gains have been from four to almost seven times the increase for the country as a whole.

Here's the city-by-city octane increases for premium on the Pacific side of the Rockies for this year:

Portland, Ore., 1.2 octanes; Bakersfield-Fresno, 1.5; Los Angeles, 1.6; San Francisco, 1.7; Spokane, 2.0; and Seattle, 2.2.

This is a pronounced break from the past. For years West Coast gasoline quality has been at or near the country's low. During 1955 and 1956 the best city average west of the Rockies was generally inferior to and only occasionally equal to the national average. The lowest city average on the Pacific Coast was as much as 1.2 octanes below the U. S. average.

This difference hit its widest point in January of this year. The U. S. average that month was 98.4 RON. The high city average on the Pacific Coast then was 97.5. And the low coast city average was 96.8, 1.6 octanes below the average for the country as a whole.

Lead changes . . . Things began to change early in 1958 when Tidewater introduced its 100-octane premium on the West Coast.

Since then premium quality has edged ahead on the West Coast and almost leveled off elsewhere. In October there were three 100-plus premiums on sale in five of the six West Coast cities covered in the Ethyl survey. Except for Phoenix, no other city in the country had as many premium brands at 100 octane. Only two cities in the usually highly competitive east, Baltimore and Richmond, had as many as two 100-octane premiums.

As a result, motor-fuel quality on the West Coast has gone above the national average. Average quality there was equal to the Middle West and only a tenth below the Northeast's high.

Rocky Mountain octanes are the lowest by far. Actually, however, because of the influence of altitude, the highest "effective" octane motor fuel in the country is available in this area. Inclusion of Phoenix in the Rocky Mountain area tends to inflate the figures for this section. Its October average was 99.0, while other cities in this area ranged from Salt Lake City's low of 94.3 to the Billings, Mont., high of 98.2.

While premium has gone ahead on the Pacific coast, regular has lagged, comparatively. It increased in most cities but actually fell back an average of 0.1 octane in Portland between January and October. Despite increases ranging from San Francisco's 0.5 octane to Seattle's 1.2 octane, the arithmetical average for the West Coast was well under the U. S. figure.

The arithmetical average for the six coastal cities was 88.9 against 91.4 for the country as a whole. Thus, whereas West Coast premium average was 0.2 octane above the national average, West Coast regular was 2.1 octanes under it.

Here's a Rundown on Premium Averages

Section—	Oct. 1955	Oct. 1956	Oct. 1957	Oct. 1958
Northeast	96.6	97.4	98.7	99.0
Southeast	96.9	97.6	98.3	98.5
Middle West	94.9	96.6	98.3	98.9
Southwest	95.8	97.1	98.2	98.7
Rocky Mountain	93.4	94.6	95.7	96.7
West Coast	95.6	96.6	97.4	98.9
U. S.	**96.0**	**97.1**	**98.1**	**98.7**

Conoco Joins Tax Fight

THE 5-YEAR-OLD severance tax on oil and gas production in Colorado is being attacked on another front. Continental Oil Co. has filed suit against the state in Denver district court demanding a tax refund.

Similar suits, challenging constitutionality of the tax, were filed earlier by The California Co. and Union Pacific Railroad. Calco's case is now before the Colorado Supreme Court on appeal from an adverse lower-court ruling (OGJ, Sept. 29, p. 47).

Conoco contends the graduated 2 to 5% tax on gross income derived from oil and gas production is un-

constitutional, discriminatory, and illegal because it imposes a levy on U. S. government lands leased to the company. Conoco also claims that some of the oil on which it paid taxes is produced for and sold in interstate commerce.

"This tax thus poses an unreasonable burden on interstate commerce and is an illegal attempt by Colorado to exercise extraterritorial jurisdiction beyond the limits of the state," the complaint says.

Refinery Is Closed

by Amoco. Louisiana plant will be dismantled soon.

TECHNOLOGICAL advances have sounded the death knell for another refinery. This time it's American Oil Co.'s 35,000-bbl. plant at Destrehan, La., near New Orleans.

Winston S. Peeler, vice president in charge of manufacturing, said shutdown activities will start immediately. Dismantlement will be completed shortly after the first of the year. Peeler said the move is a result of several factors, including unused capacity and more modern and efficient facilities at other locations.

Amoco has a new 35,000-bbl. plant at Yorktown, Va., which went on stream last year; a 157,000-bbl. plant at Texas City; and a 40,000-bbl. plant at El Dorado, Ark. None has been operating at capacity.

Peeler said several million dollars would be required for a new crude unit and other improvements if the refinery were kept in operation. Ironically, a modernization program was undertaken at the plant when Pan-Am Southern Corp. (since absorbed by Amoco) added several processing units several years ago, including the first Model IV fluid catalytic cracking unit. In addition to this 19,000-bbl. unit, the plant includes a 3,200-bbl. fluid hydroformer, a 2,000-bbl. alkylation plant and a 400-ton coke unit.

To alleviate the effect of the shutdown on refinery personnel, Amoco is setting up placement facilities and is advertising in area papers to help relocate personnel. Some will no doubt find positions with other plants in the Indiana Standard family.

Benefits of more than $1 million will be distributed to 470 employes affected by the closure. About $700,000 of this will go for severance pay alone. Older employes will be eligible for early retirement benefits and those over 51 for supplemental age allowances.

watching WASHINGTON

Bertram F. Linz

• Labor spreads its political wings

THE GROWING POLITICAL POWER of organized labor is something for oil men to watch.

The United Automobile Workers hasn't yet captured the Michigan senate, but it controls the lower house and a lion's share of the appointive posts. It was the labor vote that elected "Soapy" Williams governor in 1950 and has kept him in office ever since.

This year the UAW spread out. It made inroads into the adjoining states of Illinois, Indiana, and Ohio. Labor showed its strength in four other states, too, where it killed right-to-work laws.

There is much speculation as to why Williams got thousands of votes fewer this year than in 1956. There are two stories. One is that the Republican candidate put up a good fight. The other is that the UAW held back some votes as a warning to Williams, who apparently got off the labor track slightly somewhere along the line.

This month's elections laid the groundwork for the 1960 presidential campaign. Labor plans then to come out in force. It probably won't happen in 1960, but the time may come when the U. S. has a labor president. A gentleman named Reuther reportedly has aspirations in that direction.

• Foreign-investment probes to start

OIL COMPANIES operating abroad are likely to get a good congressional going-over even before the next session opens.

The first of a number of big investigations expected over the next year will open 2 weeks hence. A House ways and means subcommittee will start a probe of U. S. policy toward private foreign investments. It is seen as going into taxes and depletion on foreign production, among other things.

When oil men get through with that, they can trot over to the other side of the Capitol. A Senate subcommittee will get going in January on a number of studies of our relations with Latin America. It is expected to probe the situation there with respect to some major commodities, including oil.

Both probes will have one thing in common. They will undoubtedly delve into the policies and practices of companies operating in foreign lands.

• Product-import controls in lap of ODM

THE NEW IMPORT-CONTROL PROGRAM now being written will not cover refined products.

But Washington officials concerned with the import problem expect that product controls may be taken under study by the Office of Defense and Civilian Mobilization almost any day.

An ODM finding that imports threaten national security must be sent to the White House before products can be controlled.

Government experts say that cutting up the foreign products pie could be a lot tougher even than the job of carving crude imports in such a way that nobody gets mad enough to kick over the voluntary program. Nonrefiner imports might be difficult to handle.

Some domestic interests may start the ball rolling pretty soon, however. It is quite likely that an appeal for product quotas will be filed as soon as the new crude-import program comes out.

Whatever is done will have to be by the ODM. The Tariff Commission said "no, thanks" to TIPRO's plea for escape-clause relief.

Bert Linz, the Journal's veteran Washington editor, retired November 15. This is his final Watching Washington column—and brings to close a career of more than 40 years of reporting the Washington scene.

Borden Report Attacked

. . . by head of big Canadian firm. Imperial's White sees too much control as threat to well-being of oil industry.

OPPOSITION to the recommendations of Canada's Borden Commission on Energy picked up strength last week.

J. R. White, president of Imperial Oil, Ltd., Canada's largest integrated oil company, declared in a public statement that controls suggested in the report would be excessive and discourage private investment in Canada.

His attack was the first strong stand taken by a major in Canada after nearly 2 weeks of silence which followed release of the report (OGJ, Nov. 3, p. 45).

The Canadian Petroleum Association assailed several aspects of the recommendation immediately after its release. Executives of several smaller companies earlier had favorable comment.

But White left no doubt how his company, an affiliate of Standard Oil Co. (N. J.), felt about the Borden recommendations. He said:

"These directly threaten the well being of the oil and gas industries and, by implication, Canadian business in general and the resource industries in particular."

White said the Borden document requires careful examination and expert appraisal to assess its full implications which he believes concerns all Canadians.

He asserted he believed much of the comment so far reflects cursory reviews of its recommendations rather than a careful scrutiny of the full report.

Very little good . . . White observed that if properly implemented the recommendations could help development of oil and gas industries in the national interest.

"The report confirms the necessity of export markets for Canada's oil and natural gas and recommends establishment of a national energy board to serve government in an advisory capacity," White said.

"However, the complex and extensive system of controls which the commission proposes could do little else than hamper the energy industries and restrict their development. They would discourage enterprise of the kind that brought about the sound development of Canada's petroleum industry during the last 11 years."

White said that Canada's energy industries were built on the flow of capital from institutions and private investors amounting to billions of dollars.

"Literally millions of people invested their savings to provide the $4.5 billion which went into the oil and gas industries alone from 1947 to 1957," he said. "The confidence of the investing public is sensitive and has been disturbed by the prospect of undue regulatory interference."

Threat to oil . . . Machinery for sweeping controls over the entire industry is created by the report.

White said this is contained in sections of the report spelling out restrictive regulations for pipelines and extensive powers for the energy board. He added: "This is one of the most disturbing aspects of the report."

The Imperial executive specifically said the report:

. . . Makes no allowance for competition that exists between various sources, forms, and uses of energy.

. . . Recommends gas export and then sets up a procedure that will delay bringing it about.

. . . Makes it virtually impossible to secure public participation in financing pipeline construction in Canada.

. . . Raises doubts about the sanctity of contracts as a basis for private financing.

"There is need to remove the doubts and fears raised by the report. I believe that if this report is implemented in full, real harm would be done not only to the oil and gas industries but to the commercial life of the country."

White, however, said he is confident that the good sense of the people of Canada and its government will not permit adoption of any measures "harmful to the long-term interests of the country."

Sinclair and OCAW to Talk

. . . wages in Kansas City this week after 5-month lull. Industry holds the line as locals take strike votes.

THE OIL INDUSTRY'S 1958 wage pattern may emerge from bargaining sessions which start in Kansas City Tuesday between Sinclair Refining Co. and the Oil, Chemical, and Atomic Workers International Union.

The negotiations will be the first in the industry since June 13 when Sinclair broke off 5 days of bargaining without making an offer on any major demand of OCAW.

All other companies have also refused to accept the union's program or make any counterproposals. They said their action is dictated by declining profits.

The OCAW bargaining team is headed by Pres. O. A. Knight, who late in October took personal command of the union's long-stalled 1958 bargaining program.

OCAW represents 9,000 Sinclair workers in pipeline, production, refinery, and research operations. The Sinclair-OCAW contract is the union's only nation-wide agreement in the oil industry. All other bargaining in behalf of 105,000 oil workers is on a plant-by-plant basis.

The Sinclair contract runs until June 14, 1959, but was reopened last June for negotiations on wages and hours.

Strike votes . . . OCAW locals throughout the country are currently taking strike votes and filing the necessary dispute notices.

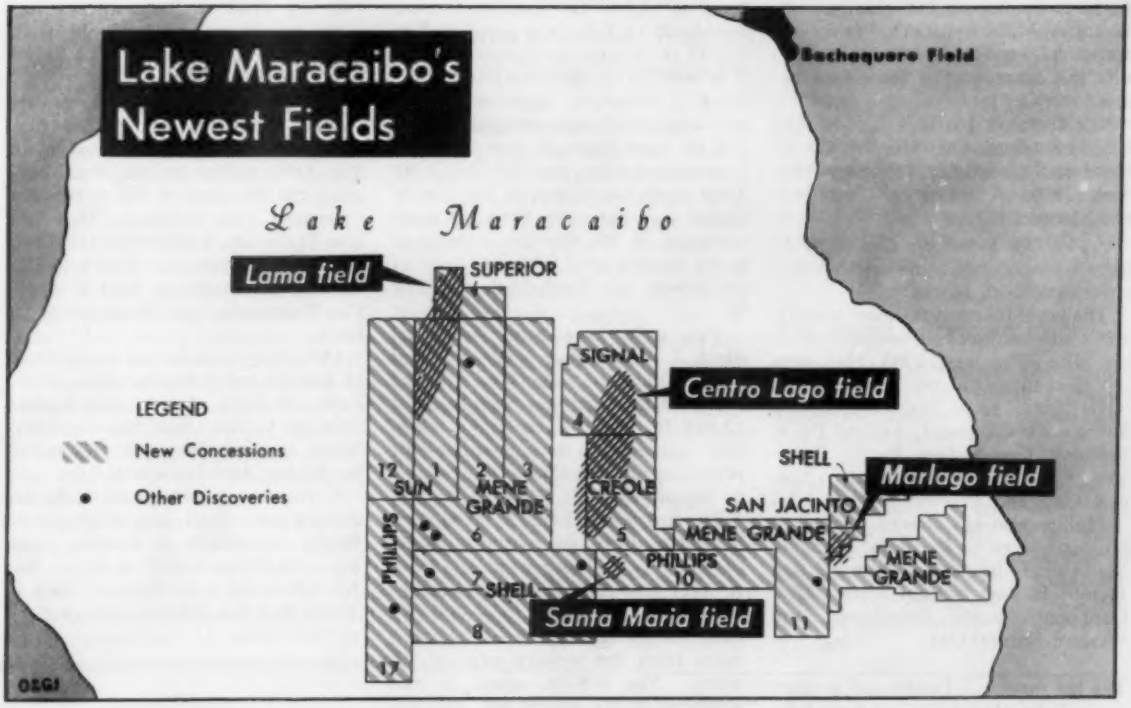
Knight said strike action might not be used, "but obviously if we are to make any impression on the industry that will cause them to begin making realistic offers, we've got to load the gun and show them we mean to use it if we're forced to.

Notices of strike action vary from 72 hours in some plants to 30 days in others. A number of locals, notably those in Standard Oil Co. (Ohio), are already working without contracts.

The demands . . . The 1958 bargaining program, launched last February, called for a wage adjustment pegged to the cost of living, a 3.5% productivity increase, longer-term contracts where automatic wage adjustments were provided, substantially increased severance pay for laid-off workers, and 4 months' advance notice of major layoffs.

Then on September 29 bargaining groups were ordered to press for a 25-cent per hour general increase in lieu of the mandatory over-all program.

OCAW estimates the wage formula is now worth 21 cents, or 7¾% of the current average oil-industry wage of $2.70 an hour. The last wage increase granted to OCAW was in May 1957. It amounted to 6%.



Maracaibo Is Good to Newcomers

• Most of the oil that has been found on new acreage granted 2 years ago is in Lake Maracaibo tracts awarded to newcomers to the lake. Some new oil also has been discovered in eastern Venezuela and in the Gulf of Paria.

TWO YEARS ago oil companies started paying $667 million to the Venezuelan Government in the most expensive land rush in history.

Since then drills have churned continuously to find out whether the oil was in fact there. Some concessions have been notoriously successful, even with prospects for fast payouts tempered by the business recession and U. S. import restrictions.

Years will be needed before every company can decide whether the cost was worth it. But events have unfolded fast. Here is a rundown on what companies have got so far to show for their $667 million.

Newcomers . . . Over 100,000 bbl. daily is now produced from new Lake Maracaibo concessions, which cost $401 million in bonuses and taxes.

All this new Maracaibo production is coming from acreage won by newcomers to the lake. Here's how these companies are faring:

. . . Superior Oil Co. has produced a peak of more than 67,000 bbl. daily from Lama field on its 7,774-acre tract in midlake. Two years ago a big industry question was whether Superior would find oil on the $22-million concession. Today the mystery is where the oil is finding its customers.

In addition to its own program, Superior is drilling a farmout from Creole Petroleum Corp. about 20 miles north and east of its own wells. The 139-1 wildcat is projected to 14,000 ft. to test Cretaceous. Superior is acquiring an interest in three tracts totaling 3,705 acres.

. . . Venezuelan Sun Oil Co., operator on Block 1 to the south of the Superior acreage, has completed 15 producers on the concession.

Sun's latest producer, SVS 17, is flowing more than 4,000 bbl. daily from each of two zones, upper and lower Eocene. The well is the fifth dual producer on the 24,000-acre tract.

Only 3 of the 15 wells test less than 3,000 bbl. daily, and the best tests over 10,000 bbl. daily. All the producers are on the northern half of the block.

Partners in Block 1 are Venezuelan Atlantic Refining Co. and Texaco Seaboard, Inc. The group, together with the Signal-Hancock group and Pan Venezuelan, have opened a $3-million terminal at Punta de Palmas on the west shore of the lake about 30 miles south of Maracaibo.

Reports from Venezuela are that the Sun group plans to install a 100,000-bbl. daily automatic flow station in Block 1 and lay an 18-in. flow line to the terminal.

. . . Signal Oil & Gas Co. has increased production on its Block 4 Centro Lago field to 15,000 bbl. daily since the opening of the Palmas terminal. Two rigs are drilling on the 27,613-acre concession, and a third is expected by the end of the year. Signal's partners in the block are Hancock Oil Co., Pure Oil Co., and Standard Oil Co. (Ohio).

. . . San Jacinto Oil Co., operator

for a small national-reserve block offsetting Mene Grande's Cueta field in the eastern side of the lake, has produced as much as 22,000 bbl. on peak days from five wells. Output is expected to average 25,000 bbl. daily with the opening of a new flow station.

San Jacinto's partners in Marlago field are Union Oil, Murphy Corp., Monsanto Chemical, Tennessee Gas Transmission, American Petrofina, and Sharples Oil.

. . . **Phillips Petroleum Co.,** operator in two blocks, has come up with discoveries in both blocks.

The latest find was the most western and southern discovery ever drilled in the lake. The well, LPG 13-2, was the first successful test on Block 17 (OGJ, Nov. 3, p. 68). Partners are Sunray Mid-Continent, Ashland Oil & Refining, Kerr-McGee, Pacific Petroleum, Canadian Atlantic, Western Natural Gas, and El Paso Natural Gas.

Phillips also has at least one 4,000 bbl. daily well in its Block 10 Santa Maria field. Its partners here are San Jacinto, El Paso Natural, Sunray Mid-Continent, Pacific Petroleums, and Western Natural Gas.

The big three . . . Established producers in Lake Maracaibo also have been busy checking their new areas.

But because Cia. Shell de Venezuela, Creole Petroleum Corp., and Mene Grande Oil Co., already had large output, results of their tests have not caused the same stir through the industry. Here's how the old timers stand:

. . . **Cia. de Shell** will probably be the first to start full-scale production from new acreage. It is laying a 12½-mile, 20-in. flowline from its 10,185-acre national-reserve tract in the southeast part of the lake. It reportedly has brought in a producer in every try in the block.

Shell paid $2,750 per acre for the concession, the second highest price per acre, after Superior, of any of the new grants. The block is located north of San Jacinto's Marlago field and Mene Grande's Cueta field and south of Creole's southern Bachaquero.

To the southwest in midlake, Shell has drilled two wells each rated at better than 2,000 bbl. daily on Block 7. VLE 196, at 13,038 ft., is in the eastern part of the block, and VLE 198, at 14,122 ft., is on the western side. A wildcat on Block 8 has been suspended at 14,647 ft.

. . . **Mene Grande** has said little about its work on Blocks 2, 3, 6, and 11. The company paid a total of $104 million for the blocks.

Reports from Venezuela indicate the best well so far is on Block 11, where 11-Y-1x is credited with testing more than 3,000 bbl. daily of 32°-gravity crude from Eocene. Total depth is 14,066 ft. Another test on the block, 11-Y-2x, was suspended at 13,595 ft. because tests were wet.

A well in the northwest corner of Block 2 offsetting Superior acreage was considered noncommercial. The 2-Y-1x was reported completed in Cretaceous for less than 300 bbl. daily. Total depth was 10,864 ft. The 2-Y-2x drilled on the same block 3 miles southeast of the first try is believed to be capable of 1,000 bbl. daily of 34°-gravity oil. Total depth is 11,558 ft.

Two wells have been drilled on Block 3, lying between Block 2 and Signal's Block 4. The 3-Y-2x in the center of the tract was abandoned at 12,988 ft. The 3-Y-1x in the northeast corner is testing supposedly promising sands similar to those found by Signal. Depth is 11,958 ft.

The first test on Block 6, the 6-Y-1x, located south of the southeast corner of Block 2, was suspended at 13,040 ft. after reportedly testing water. The 6-Y-2x was completed for 1,200 bbl. daily of 37°-gravity crude about 2 miles from the western edge of the block. The 6-Y-3x, about 1 mile southeast of the second test, also was completed at 1,200 bbl. daily, producing 32°-gravity oil. The wells were bottomed at 13,213 ft. and 13,662 ft.

. . . **Creole has found** what appears to be very prolific production on the west half of its 25,441-acre Block 5. CLA-5 in the northwest corner tests 3,700 bbl. daily from Eocene. Twenty locations have been plotted which Creole thinks will be productive. The CLA-6, drilled in the corridor between Block 5 and Mene Grande's Block 6, tests at 5,000 bbl. daily (OGJ, June 2, p. 89).

Other areas . . . Some success has been achieved on new concessions elsewhere in Venezuela, but results have not been as spectacular as in Lake Maracaibo.

New Monagas acreage cost Pan American Petroleum Corp. (Indiana Standard), a Phillips group, and Creole $89 million. So far two discoveries have been made.

Phillips found a major low-gravity oil reserve in the Tremblador area of the eastern Venezuelan state. Three wells on Lot 9 have each found more than 350 ft. of net pay sands and test up to 1,200 bbl. daily flowing and on pump. Ownership in the 25,000-acre tract is the same as for Block 17 in Lake Maracaibo (OGJ, Sept. 29, p. 52).

Pan Venezuelan has drilled five heavy-gravity producers in Mona field on Block 11 in southern Monagas. These offset production in Creole's Jobo field located on old acreage.

In the Gulf of Paria drilling has so far turned up one 2,000-bbl. well, Posa 112-1. The second test, Posa 103-A, has been abandoned.

Paria Operations, Inc., is moving the rig northwest for a third test. Partners in the program paid more than $100 million for six blocks covering 153,000 acres in waters between Venezuela and Trinidad. They are The Texas Co., Continental Oil, Ohio Oil, Cities Service, and Richfield Oil. Other Paria blocks are held by Shell, Pan Venezuelan, and Venezuelan Atlantic.

Other new concessions in the State of Barinas and in frontier areas of the states of Zulia, Apure, and Tachira have yet to yield their first discovery. Some acreage along the Colombian border has been renounced.

Creole has given up all its border concessions. Shell renounced all its border concessions in Tachira, keeping a 49,400-acre tract in Zulia. Sun has renounced a 24,700-acre block in Apure that lies west of acreage given up by Creole.

WORLD

A 30,000-bbl. refinery at Aspropyrgos, Greece, has gone on stream. It will be operated for 10 years by Oil Transport Trading & Refining. Stavros Niarchos, tanker magnate, is the largest stockholder. Socony Mobil, also part owner, will supply Middle East crude (OGJ, Sept. 22, p. 72).

A new diesel-electric pipelaying barge has completed its first major chore for Creole Petroleum in Lake Maracaibo. The C-26 laid nearly 5 miles of 16-in. pipe to manifold 5 in Tia Juana field. It has more automatic equipment than has ever been available before on a barge.

An airborne magnetometer survey of England's north midlands and part of the Irish Sea is nearing completion. The flying phase has already been completed by Canadian Aero Service, Ltd., Ottawa, and the maps will be delivered to the Geological Survey and Museum at London this month. About 13,750 line miles were surveyed, including about 2,000 miles of the Irish Sea.

Capital will be raised through a $48-million bond issue for expansion of Montecatini, Italy's largest chemical combine. Expansion includes two

Argentine Pacts Target

. . . of striking oil workers in Mendoza province. Frondizi sticks by guns and threatens use of force if necessary.

OPPOSITION has reared its head to Argentina's new oil development contracts signed with foreign firms.

Striking oil workers in Mendoza province have shut in one quarter of the country's total crude production, about 25,000 bbl. daily, and have closed down Lujan de Cuyo refinery. They are protesting contracts signed with United States companies for the development of oil supplies for YPF.

There are signs the strike is tied to behind-the-scenes political unrest. The walkout was called after visits to Mendoza by leftist and ultra nationalist foes of the new government of President Arturo Frondizi.

Rogelio Frigerio, who played a key role in negotiating the oil agreement, has resigned as the president's economic and social secretary.

Military leaders reportedly demanded his resignation.

President Frondizi, however, is making it clear he intends to stick by his oil policy. In a nation-wide television broadcast, he ordered the Mendoza strikers back to work and threatened the use of force if necessary.

He blamed the strike on Communists and Peronists. Two days later, the government arrested John W. Cooke, right-hand man of former dictator Juan Peron, as he stepped off an airplane onto Argentine soil. Cooke was believed to be masterminding from outside the country Peron's struggle to regain power.

Ultimatum given . . . In defiance of Frondizi's order, the National Oil Workers Union issued an ultimatum.

It gave the government 2 days to nullify agreements with three U. S. firms or face a 48-hour, nation-wide strike. The oil workers later offered to postpone the national strike in order to discuss its objections.

The threat to Frondizi's plans came to the surface 3 months after he announced his program to bring in $1 billion or more in foreign investment by means of development contracts.

Since then, agreements have been signed with Carl M. Loeb, Rhoades & Co., Pan American International (Indiana Standard), and Union Oil Co. of California. A tentative agreement has been signed with four firms controlled by Floyd Odlum and Williams Brothers (OGJ, Oct. 20, p. 71).

YPF Signs Servicing Pact

THE ARGENTINE Government has signed a contract with a Dresser Industries subsidiary for well servicing and completion work.

Yacimientos Petroliferos Fiscales signed the contract with Dresser A. G. of Lietchenstein. Lane Wells Co., another subsidiary, will do the work. The 3-year contract calls for a fixed payment per team hour work plus standard fees for special services. The contract has provision for 1-year extensions.

BRIEFS . . .

new petrochemical cracking units, one at Ferrara in northern Italy and the other in southern Italy. A new plant with capacity of 10-million pounds per year will be built at Terni in central Italy to produce polypropylene staple fiber and continuous thread.

First wildcat by Pakistan Shell Oil in West Pakistan has been abandoned as a dry hole. The well, Giandari 1, in Dera Ghazi Khannon, was the twenty-sixth dry hole in the west wing in the past 3 years.

Start of the first well by Ohio Oil Co. of Guatemala is expected by March 15 next year. Chinaja 1 will be located on the Arruga Grande anticline. It may go to 13,000 ft. Brown International Drilling will be the contractor (OGJ, Oct. 20, p. 71). Partners in the 109,539-acre concession are Amerada, Continental and Union.

Russia reports a 2,180-bbl. daily well in Kamenolozhskoye field in the Western Urals. They say the well is the most prolific found so far in that area of the "second Baku." There is a 210-ft. pay, extending to 5,650 ft.

India and Russia have signed their agreement for construction of a refinery at Gahauti, in Assam. Romania will supply equipment and construction help for the 10,000-bbl. to 15,000-bbl. plant (OGJ, Sept. 15, p. 121).

A 1,300-sq. mile concession in the Toulouse area of southwest France has been awarded to Cie. des Petroles France-Afrique. The firm will spend at least $1.2 million in a 3-year program.

Probably the deepest well ever drilled from a floating barge has been abandoned in Trinidad by Dominion Oil. Standard of California bottomed the test at 10,814 ft. as a dry hole in the Gulf of Paria. Offshore Co. of Baton Rouge, the drilling contractor, drilled the test in 4 months, 18 days.

A price reduction of 9 cents per barrel on two high-gravity Venezuelan crudes has been made by Creole. Cumarebo crude now sells at $3.66 for 48.0°-48.9° gravity, and San Joaquin crude at $3.25 per barrel for 41.0°-41.9°-gravity oil.

The seventh well in Japan's new Tamugiyama field in Niigata prefacture came in with a flow of 629 bbl. daily. The field is one of the best found by Japan Exploration in its program to increase small domestic production (OGJ, Apr. 28, p. 76).

A contract has been awarded Graver Tank & Manufacturing to build storage tanks for Norway's largest refinery, now under construction by an affiliate of Jersey Standard. Graver will build 62 storage tanks for the refinery, located in Slagen on the west side of the Oslo Fjord.

Russia may build a crude pipeline to Poland and East Germany. Talks now under way in Moscow reportedly are deciding the fate of the project, especially the share of cost each country will pay if the line is built.

Hungary is making up for some of the crude-production losses of the past 2 years that resulted from the anti-communist revolution. Output the first 9 months this year was up to 16,400 bbl. daily. But this was still off from 1955 output of 31,800 bbl. daily.

A Houston office has been set up as headquarters for foreign operations of Dowell division of Dow Chemical Co. Dowell also plans to extend its oil and gas-well services to Argentina. An office will be opened in Comodoro Rivadavia.

THIS PLATFORM-TENDER combination soon will be drilling in the Persian Gulf.

Neutral Zone Deal Signed

. . . by two drilling contractors who will drill for Japanese in the Persian Gulf. First well planned next spring.

TWO DRILLING contractors are joining forces in a multimillion-dollar drilling job that will make them the first drilling contractors to enter the Persian Gulf.

The two are International Drilling Co., a Hague-based firm operating primarily in the Eastern Hemisphere, and Reading & Bates Offshore Drilling Co., Tulsa, which operates in the U. S. Gulf Coast.

International Drilling, operator for the two, has signed a 2-year contract to drill off the Neutral Zone for Arabian Oil Co., the Japanese firm which broke the 50-50 profit split in winning a concession in the Persian Gulf (OGJ, Nov. 3, p. 69).

The arrangement worked out by the two contractors combines the special talents and equipment of each into a package deal.

Primarily, International will furnish the Middle East experience and supply lines while Reading & Bates will furnish the equipment and offshore drilling know-how.

The companies expect to spud the first wildcat in the concession by April 1. The first test will be several miles offshore in about 120 ft. of water.

Reading & Bates' mobile platform, the C. E. Thornton, and tender, the J. W. Bates, will be used on the first well. The tender will be used along with the platform to provide added storage facilities. The contractors will have about $7.5 million worth of equipment on hand for the first well.

If the first well is a success, a smaller platform will be moved to the Persian Gulf to work with the tender, and other development wells will be drilled from the C. E. Thornton.

Both the platform and tender are now working in the Gulf Coast. Both will start the long tow to the Persian Gulf around December 1.

Don R. Stewart, who works for Reading & Bates out of Lake Charles, La., will be drilling superintendent on the Neutral Zone job. He will work out of a supply base in Kuwait.

Pipeline to Use Free Piston

A FREE-PISTON engine will be used in pipeline pumping for the first time on the Iraq Petroleum Co. system to the Mediterranean.

The 3,000-hp free-piston gasifier turbo-pumping unit will be installed in Syria. It is expected to go into operation in 15 months. National Free Piston Power Co., a subsidiary of the Hawker Siddeley Group, has a $420,000-contract covering design and equipment supply.

Free-piston engines, appearing on a commercial basis after years of experiment, also are being installed in the power plant of a tanker terminal under construction at Bougie, Algeria.

Eleventh-Hour Find

in Papua gives New Guinea search new lease on life.

EXPLORATION in Papua may turn out to have a Hollywood happy ending with a possible last-minute discovery in the last wildcat in a $67-million program.

Puri 1 in Australian New Guinea initially tested at the rate of 1,000 bbl. daily of crude and condensate with increasing amounts of water. The flow came from a 48-ft. limestone section topped at 7,460 ft.

The well was winding up the last round of wildcats, after which the major backers had intended to withdraw financial support. They are Vacuum Oil Co., Pty., Ltd., (Standard-Vacuum), and British Petroleum Co., Ltd., each with 45%. A local firm, Oil Search, Ltd., has 10%.

Stanvac said: "Naturally we are pleased over the possibilities, but it is much too early to make any definite assumptions as to the importance of this well." Tests on Puri 1 will continue for several weeks to determine its potential.

Several more wells will be needed to determine the commercial importance of the discovery. But the find did make Stanvac and BP decide to continue the search.

The oil and gas-bearing limestone in Puri was the first section to yield oil in 19 wildcats drilled by the company in 11 years of postwar exploration in Papua. In the past 20 years more than $67 million has been spent by the group in the program.

Oil Search had been trying to form a new company to carry on exploration at the time the discovery came in. First reports had indicated the find was noncommercial (OGJ, Nov. 10, p. 107).

Puri 1 was spudded Oct. 28, 1957. The drill site is in the Aure trough region, one of the most inaccessible and undeveloped sections of Papua. Drilling equipment, crews, and supplies must be airlifted by helicopter to the site.

Reaction in New Guinea and Australia to the discovery report ranged from wild optimism to the more cautious attitude on the part of the companies directly involved.

Prime Minister Menzies of Australia hailed the find.

"Our excitement about the discovery of oil in New Guinea is natural. Adequate Australia resources of oil would work wonders for our national economy, our balances of payment and internal credit," the prime minister said.

What you ought to know about

PROCESS FLOWSHEETS

Here's a basis for better understanding between the designer who must prepare them and the operator who must use them. The tabulation of equipment symbols should insure more uniform flowsheets.

BY D. J. ORIOLO
Catalytic Construction Co.

PREPARATION of a process flowsheet is the first major step in the over-all design of process facilities. Such a flowsheet, properly formulated, is essential for the development of the complete plant design and for producing a well-balanced plant assembly.

The flowsheet must present the process accurately and clearly, and must serve as a basic guide for use in converting the fundamental process data into a detailed engineering design of the equipment and piping which constitute the plant.

The process flowsheet serves as the basis for the preparation of preliminary layouts and of engineering flow diagrams and it aids project engineers and designers (1) in formulating specific design features of major process equipment; (2) in guiding the selection of equipment and of instruments; (3) in designing process and utility piping arrangements; (4) in the design of power generation, lighting, and related facilities; (5) in the designs of buildings and structures; and (6) in the formulation of special safety considerations and health standards.

Scope of Flowsheet

The flowsheet shows the various processing steps, their flow relationship and sequence; interconnection of all the major process, mechanical, and handling equipment; the materials entering and leaving the plant, including information on stream flow rates or batch quantities, compositions and properties; operating criteria, such as temperatures and pressures; and the basic process control requirements.

All major process equipment including tanks, vessels, reactors, heat exchangers, pumps, compressors, mechanical equipment, separation equipment and the like are shown schematically, giving sufficient descriptive information, such as name, item number, and capacity.

Special or package units are shown on the flowsheet if they directly enter the process.

Spare process equipment or parallel trains of common equipment are not shown on the flowsheet except when required to clarify the process. Such units should be designated by reference only.

Service units, such as steam generators; power stations; water wells; cooling towers; spray ponds; central heating oil and refrigeration systems; heating and ventilation equipment;

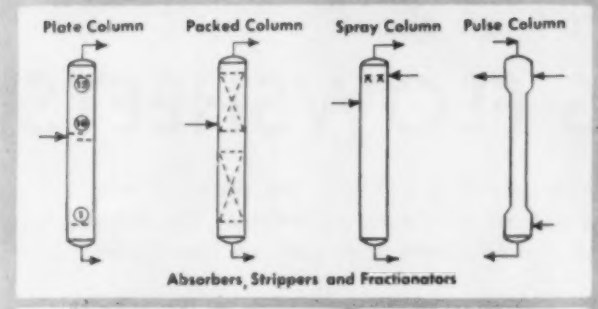
TABLE 1—INSTRUMENTATION NOMENCLATURE—COMPLETE GENERAL IDENTIFICATIONS

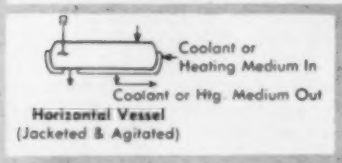
MODIFICATION OF ISA STANDARDS															
FIRST LETTER	SECOND AND THIRD LETTERS														
		Controlling Devices						Measuring Devices		Alarm Devices					
Process Variable or Actuation		Recording	Indicating	Nonindicating (Blind)	Valves	Self-Actuated Valve	Safety Valves	Recording	Indicating	Recording	Indicating	Nonindicating (Blind)	Primary Elements	Wells	Glass Devices for Visual Observation
		RC	IC	C	CV	V	SV	R	I	RA	IA	A	E	W	G
Flow	F	FRC	FIC			FV		FR	FI	FRA	FIA	FA	FE		FG
Level	L	LRC	LIC	LC	LCV	LV		LR	LI	LRA	LIA	LA	LE		LG
Pressure	P	PRC	PIC	PC	PCV	PV	PSV	PR	PI	PRA	PIA	PA	PE		
Speed	S	SRC	SIC	SC	SCV		SSV	SR	SI	SRA	SIA	SA			
Weight	W	WRC	WIC					WR	WI	WRA	WIA		WE		
Analysis	A	ARC	AIC	AC	ACV		ASV	AR	AI	ARA	AIA	AA	AE		
Hand	H		HIC	HC	HCV										
Temperature	T	TRC	TIC	TC	TCV	TV	TSV	TR	TI	TRA	TIA	TA	TE	TW	
Special	X	XRC	XIC	XC	XCV		XSV	XR	XI	XRA	XIA	XA	XE		

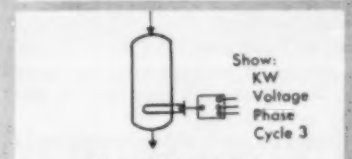
NOTE: Blank spaces are impossible or improbable combinations.

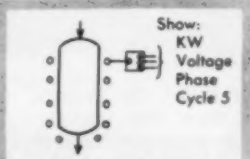
Handy chart of some of the symbols

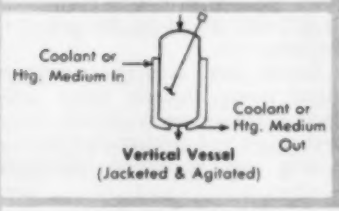
Process Vessels

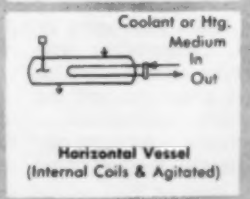


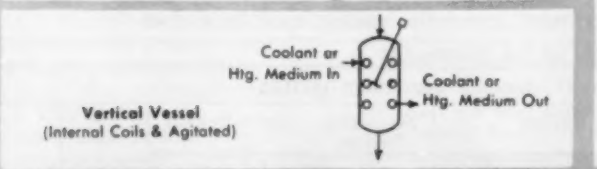




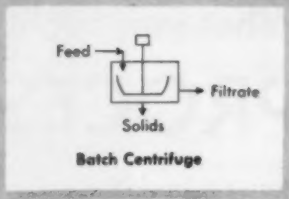


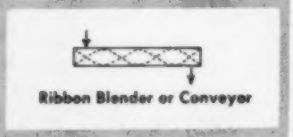


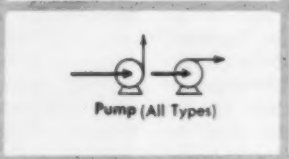


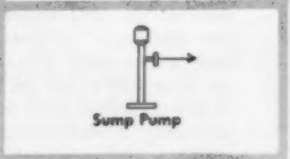


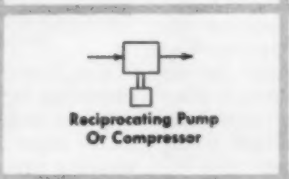
Pumps and Solids

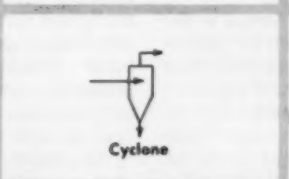


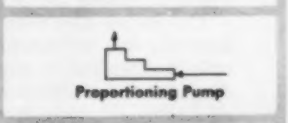


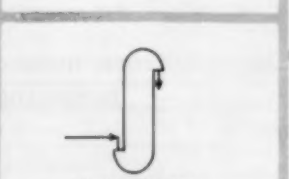




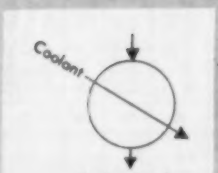


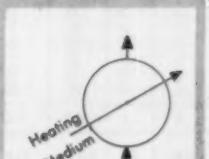


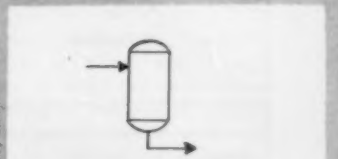


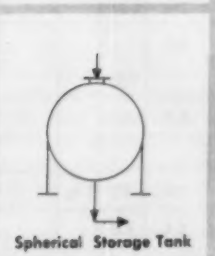


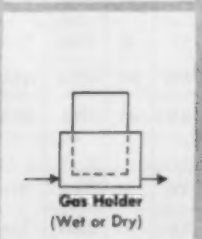
Storage Equipment

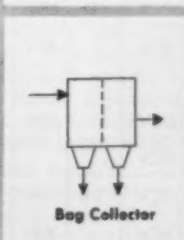


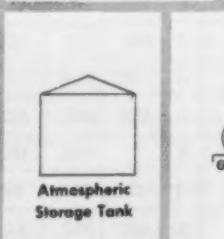


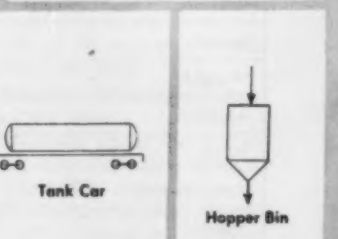






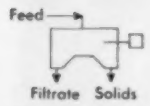






that are the "language" of process flowsheets

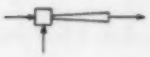
Handling

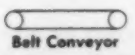


Continuous Centrifuge

Screw Feeder

Blower or Fan
Or Centrifugal Compressor

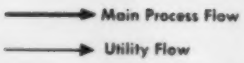

Jet

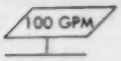

Belt Conveyor

Flight Conveyor

Size Reduction Equipment

Flow and Instruments

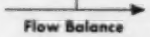


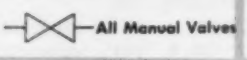


Material Balance			
Stream	Feed	Overhead	Bottoms
C_1	40	35	5
C_2	20	15	5
C_3	20	10	10
C_4	20	2	18
Total Lb.	100	62	38
Total Gal.	20	12	8

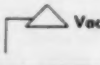
Overall Material Balance
(At Bottom of Flow Sheet)

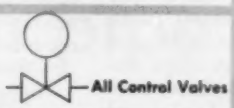
Feed	GPM
C_1	10
C_2	20
C_3	30
Total	60


Flow Balance

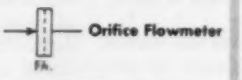

All Manual Valves

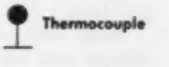
Flame Arrestor

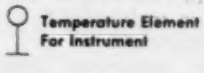

Vacuum Breaker

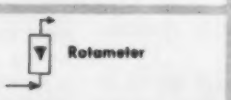

All Control Valves

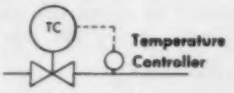
Thermowell

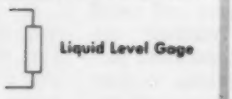


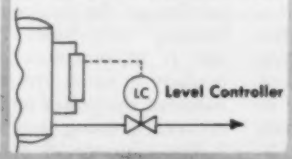

Thermocouple

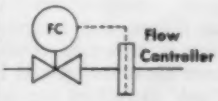

Temperature Element For Instrument


Rotameter

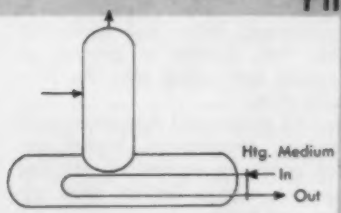



Liquid Level Gage

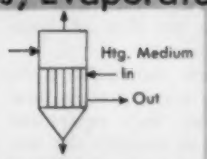




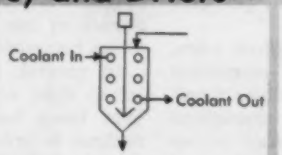
Filters, Evaporators, and Driers



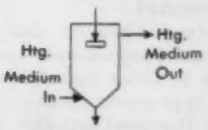
Tower with Integral Reboiler



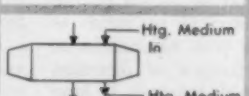
Single Effect Evaporator



Crystallizer



Downflow Spray Drier



Rotary Drier

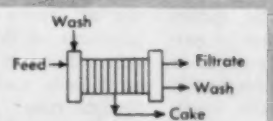
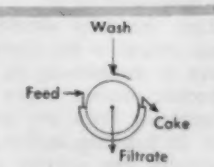
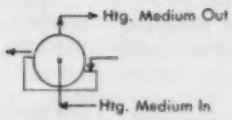


Plate and Frame Filter



Continuous Rotary Filter



Drum Drier or Flaker

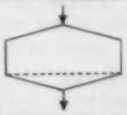
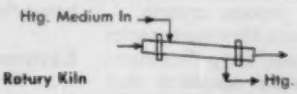


Plate Filter



Rotary Kiln

and electrical, structural, and architectural facilities are not shown.

Piping . . . All major process flows are shown on the process flowsheet. Sampling points may be located on the flowsheet if essential to the process.

Piping such as pump bypasses, startup lines, and auxiliary piping are not shown on the flowsheet unless critical to the operation. Control block valves and block valves at vessel nozzles are not shown although it may be necessary for clarity to indicate block valves at locations where the process flow splits and the flow is intended for one branch or the other, not both. When it is necessary to show valves, there should be no discrimination as to type, i.e. gate, globe, plug, etc.

Headers and piping for utilities, such as, steam, water, gas, air, etc., are not shown. However, it is desirable to show the utility requirements at the points of utilization for the equipment involved.

Designations and item numbers for piping should not be shown on the process flowsheet since such detailed information can only be depicted adequately on engineering flowsheets and piping diagrams.

Major instruments essential for clarification of process or analytical control should be shown schematically and simply, giving the type and point of control.

Process data . . . The flowsheet should include pertinent information on flow rates, stream compositions, reflux ratios, heat duties, and temperatures and pressures at operating conditions.

Equipment capacities should be indicated. Tank capacities are usually stated in gallons; pumps are rated by gallon per minute capacity; and heat exchangers in terms of B.t.u. per hour transmitted.

Material-balance data (flow rates, stream compositions, and properties) may be either included within "flags" at appropriate locations throughout the flowsheet or else listed in an over-all tabulation at the bottom of the flowsheet.

Line velocities should be shown when critical to the operation or pertinent to establishing an operable or economic process. Vapor velocities in disengaging lines are usually specified. In handling slurries, specify the minimum line velocity necessary to avoid settling of solids.

Consistent English units should be used in defining process criteria.

The size of process flowsheets varies among organizations. Strip flowsheets of 11-in. width (either actual or photographically reduced) and lengths up to 60 in. are popular since they can be neatly folded and included in process design transmittals. The flowsheet should not be crowded and equipment should be arranged properly with sufficient room allowed for the addition of later information, if required.

Insofar as possible, the flowsheet should be arranged in accordance with unit operations, unit processes, or major areas. For a complex process which can be separated into individual sections or areas, it is common to prepare individual flowsheets for each section.

Where process lines enter or leave the area on a particular flowsheet of a complex process and are shown from or to another area on a related flowsheet, each line should be plainly labeled as to its source or eventual disposition, including the flowsheet reference number.

In general, adherence to a fixed scale is not necessary but it is desirable to lay out equipment in good over-all proportion and in rough proportion, at least, to their relative sizes. Thus, a 10,000-gal. capacity tank should be shown larger than a 1,000-gal. tank.

Items such as instruments, valves, pumps, and small equipment in general, should be shown at a large enough scale to be readily readable.

Show levels . . . Equipment should be shown in proportion to their relative levels. Indicate gravity flow by the position of the equipment and avoid showing such flows "running" uphill. It is sometimes desirable, particularly in batch operations, to show mounted equipment on horizontal levels corresponding with building levels.

The sequence of operations is important and equipment should be arranged with due regard to their sequence of use in the flow of operations being performed.

In general, flow should be from left to right, with major process flow lines being heavier than equipment outlines in order to simplify the following of the flow operation. Direction of flow should be shown by the use of arrows (blocked or solid) at junctions of lines with equipment or other lines; at changes of direction of th lines, and with intervals in long straight runs.

Where vertical process lines cross horizontal lines, the vertical lines should be broken slightly above and below the horizontal ones (avoid hemispherical jumpovers).

Equipment and instrument symbols . . . Symbols used on process flowsheets to represent equipment and instruments should be simple in appearance and outlined to suggest the particular item reflected. Internals or details on vessels and other equipment are not shown except where they materially add to the reader's understanding of the process. For example, the number of shells for a multi-unit heat exchanger would not be shown.

For an agitated, internally heated vessel, however, it would be desirable to use a symbol which simply represents the vessel, its agitator, and its heating coils or heating jacket, as the case may be. For equipment which is serviced by utilities such as steam, water, heating oil, refrigerant, electric heat, etc., the type of service should be indicated by showing the external connections for the particular utility on the equipment symbol.

Designations . . . Item numbers are commonly used in conjunction with descriptive titles to identify equipment and instruments on process flowsheets.

Instruments are designed usually by a letter code similar to the system recommended by the Instrument Society of America (ISA). ISA nomenclature, somewhat modified, is given on Table 1.

Item numbering systems for equipment can vary considerably. The following general code is suggestive of a system which can be employed for assignment of items numbers:

B—Direct-fired furnaces of kilns.

D—All vessels in which a chemical reaction or physical change occurs. This will include fractionators, stripping columns, absorption columns, reactors, and converters.

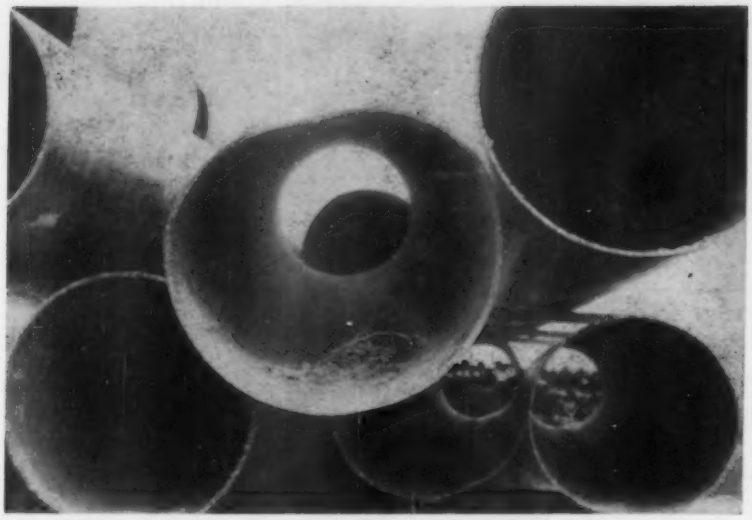
E—Heat - exchange equipment, including all heat exchangers and dryers and heaters that are not directly fired.

F—Storage, surge, and measuring vessels. This applies, in general, to all vessels not falling into the D—classification.

G—All mechanical equipment such as pumps, compressors, bucket elevators, conveying equipment, grinding equipment, mixers, feeders, dust collectors and hoists.

As an example of the use of this system, assume a plant broken down into four areas and item numbers are to be assigned to 10 heat exchangers and 3 flow recording controllers in Area 2. Designate this equipment as follows:

Heat exchangers	Flow recording controllers
2-E-1	2-FRC-1
2-E-2	2-FRC-2
2-E-3	2-FRC-3
2-E-4 (etc. through 2-E-10).	



Dents in pipe

spell trouble. Here's how they can affect service performance of pipelines

BY STANLEY P. BELONOS AND ROBERT S. RYAN
Columbia Gas System Service Corp., Columbus, Ohio

THERE is considerable interest in the gas industry concerning the effects of various defects such as dents on the service performance of pipelines and mains. A series of tests has been made to add to the data being accumulated on dents and to determine the effect of internal pressure, residual stress, and the static internal pressure at failure.

The tests were conducted on 20-in. o.d. API-5LX42 and 26-in. o.d. API-5LX52 cold-expanded pipe. Two different dents were studied. The 20-in. pipe contained a long continuous dent while the 26-in. contained a localized dent.

The results of the tests demonstrate that the metal in and adjacent to the dent contains some residual stresses even though the metal yields. The magnitude of this residual stress was obtained by the use of strain gages and was shown to increase when the depth of the dent increases and the area over which the dent occurs decreases.

Generally, the tests indicated that dents of the type studied do not affect the service performance notwithstanding the high residual stress. Apparently, in order for a dent to be serious, there must be a notch or scratch in the dent which reduces the effective wall thickness to cause failure.

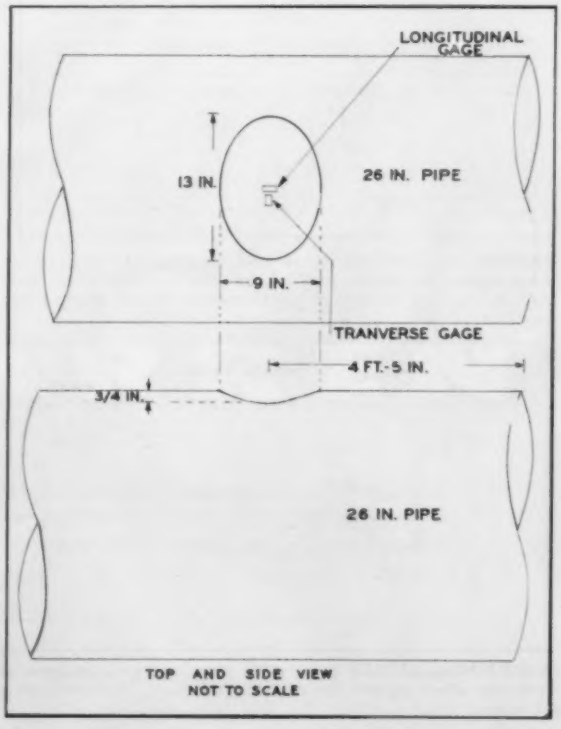
This conclusion is not meant to imply that failure will occur only if there is reduced wall thickness. For example, metallurgical notches such as cold work in the center of a dent may be just as detrimental as the reduced wall thickness.

Strain gages were installed on the exterior surfaces of the 26-in. API-5LX52 containing the dent. Strain gages were installed on the exterior and interior surfaces of the 20-in. API-5LX42 containing the continuous dent.

The strain gages were used to measure the released strain as the section of the pipe is cut smaller and smaller. As the metal is removed from the area containing locked-up stresses it tends to relieve itself by reverting to the original shape.

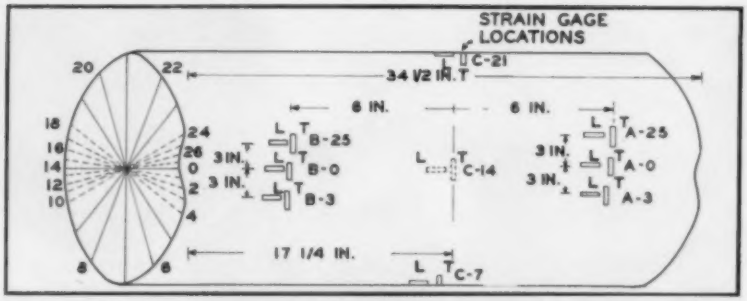
Since the metal has deformed, it has a permanent strain and can never return to its original shape. The residual stress can be measured through released strain and not the permanent strain that remains in the metal as a result of deformation.

A cursory analysis would indicate that when local yielding took place there would only be a small amount of residual stress in these localities. This is true only if the entire piece of pipe of a very large section yielded. The surrounding areas were stressed but did not yield and they are still

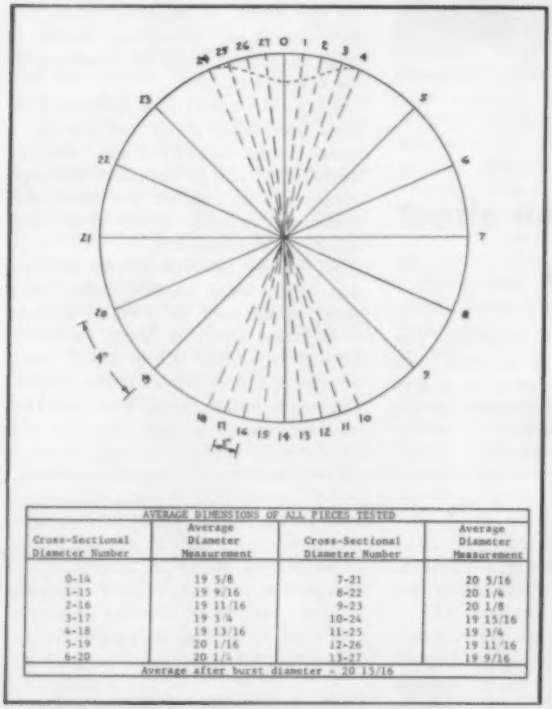


LOCALIZED DENT in 26-in. pipe has longitudinal and transverse gages attached on outside of dent.

STRAIN GAGES were installed on the dent area to measure the released strain as the section of pipe is cut smaller and smaller.

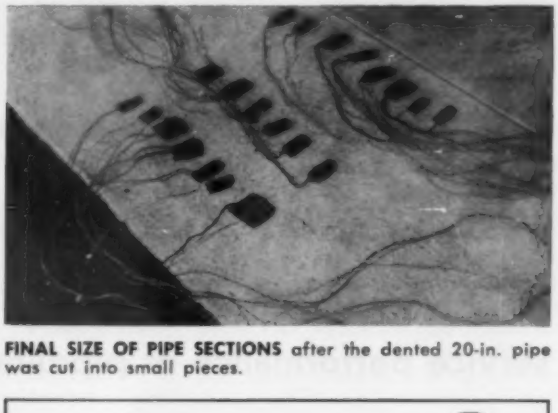


BOTH EXTERIOR AND INTERIOR SURFACES of longitudinally dented 20-in. pipe had strain gages placed as shown. The pattern was duplicated exactly on the inside surface, and the inner locations were denoted A', B', and C'.

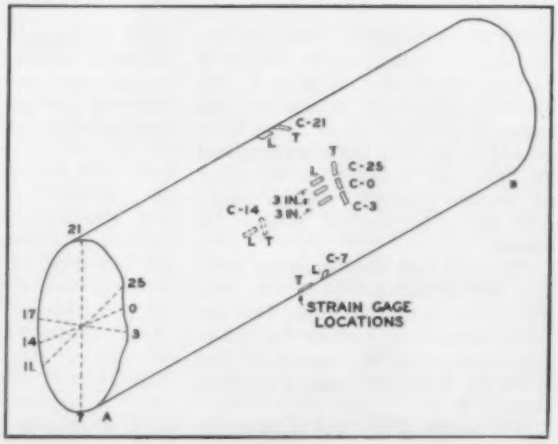


AVERAGE DIMENSIONS OF ALL PIECES TESTED			
Cross-Sectional Diameter Number	Average Diameter Measurement	Cross-Sectional Diameter Number	Average Diameter Measurement
0-14	19 5/8	7-21	20 5/16
1-15	19 9/16	8-22	20 1/4
2-16	19 11/16	9-23	20 1/8
3-17	19 3/4	10-24	19 15/16
4-18	19 13/16	11-25	19 3/4
5-19	20 1/16	12-26	19 11/16
6-20	20 1/4	13-27	19 9/16
Average after burst diameter = 20 15/16			

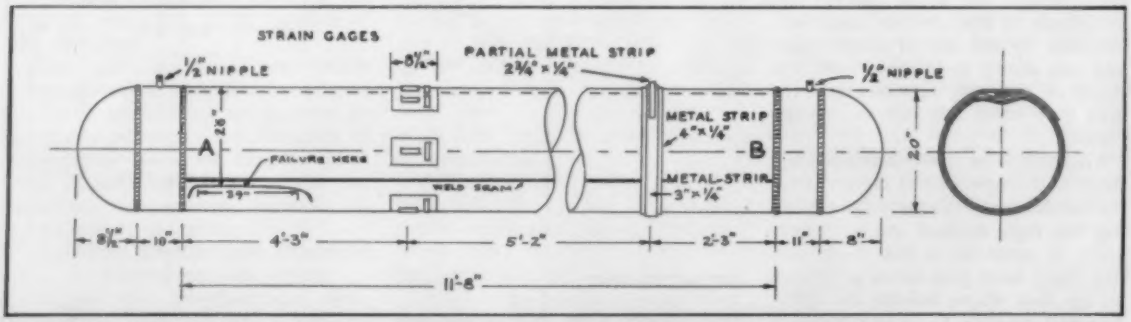
PATTERN for diameter lines and average dimensions of cross-section measurements looked like this for 20-in. o.d. API 5LX42 cold-expanded continuously dented pipe, after burst tests.



FINAL SIZE OF PIPE SECTIONS after the dented 20-in. pipe was cut into small pieces.



ON EXTERNAL SURFACES of the 20-in. dented pipe, strain gages were placed like this.



RESTRAINING STRAPS 4 in. wide were put around pipe at one end to restrain dent during burst test. This was to simulate the effect of soil restraint on the dent. Failure took place at opposite end, although pipe expanded on both sides of strap.

Warren concentrates its efforts to bring you... ***DEPENDABLE DELIVERIES OF***

NATURAL GASOLINE

Whatever the grade — whatever the volume!

- WHEN you want it,
- WHERE you want it, and the
- WAY you want it!

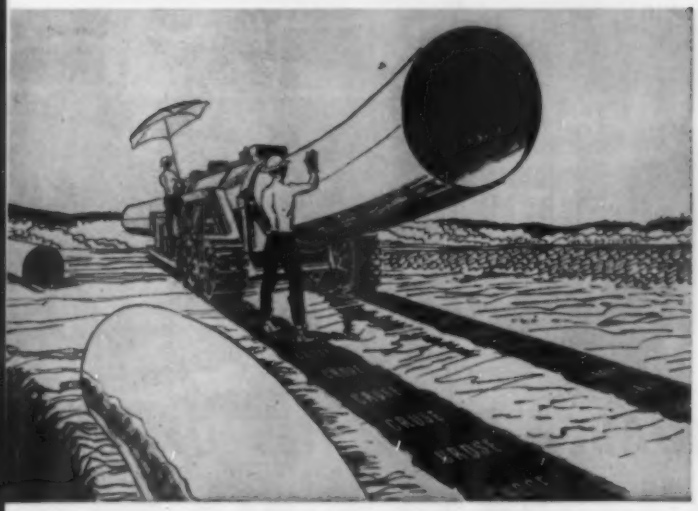
WARREN

PETROLEUM CORPORATION

TULSA, OKLAHOMA • Cable Addresses: STAVOLENE, WARREN

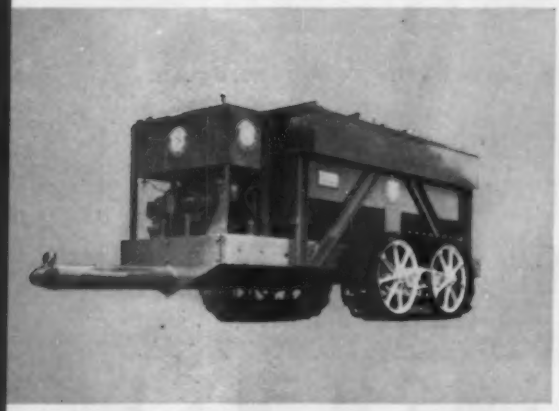
EXPORT TERMINALS: CORPUS CHRISTI, PORT ARTHUR, BAYTOWN, TEXAS CITY AND WARRENGAS, HOUSTON, TEXAS, SAN PEDRO, CALIF.

CROSE
IS MAKING TRACKS!

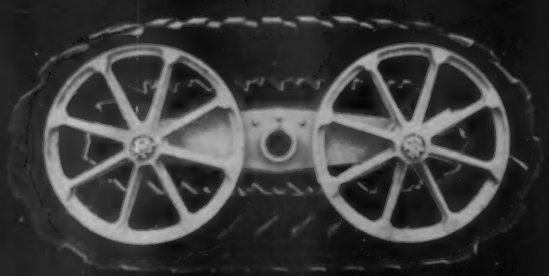


- **new simplified track design reduces costs**
- **greater track bridge strength and wear resistance**
- **one-point lubrication system**

Already field proven by rugged usage on pipe coating kettles and pipe bending machines, Crose Trac-Wheels offer important savings in operation of construction equipment along the line. Crose Trac-Wheels have all the ruggedness and durability for which Crose equipment is known around the world. Trac-Wheel spindles and pads are cast steel. Steel chassis is electrically welded. Spindle rims are flame-hardened. Pads have hardened pins and bushings. Axle and spindles are lubricated by one-point lube system. A set of Crose Trac-Wheels can be installed in less than 30 minutes.



NEW CROSE TRAC WHEELS

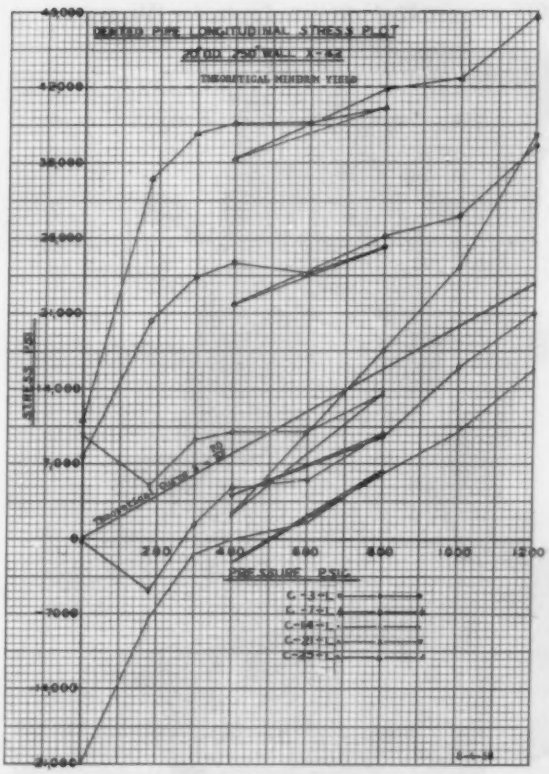


Crose MANUFACTURING COMPANY, INC.

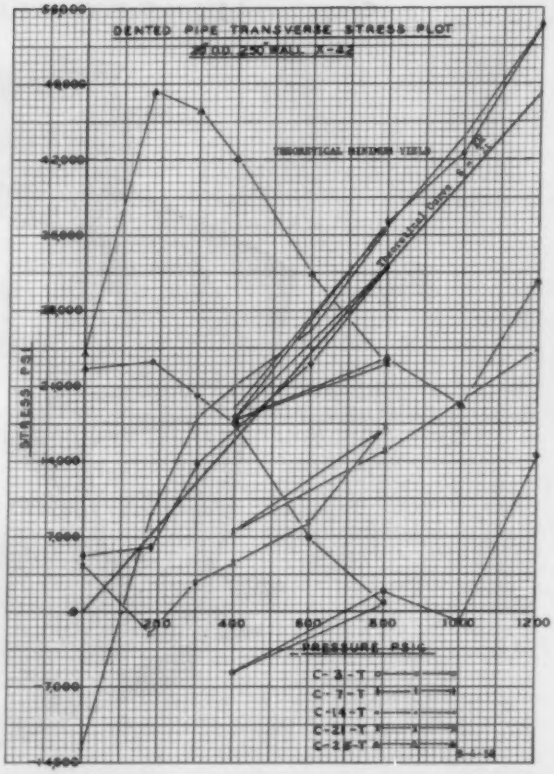
2705 DAWSON ROAD • PHONE WEbster 6-2171 • TULSA, OKLAHOMA

New York, N. Y. Ph. BRyant 9-2235 • *Denver, Colorado Ph. EMpire 6-8332 • *Houston, Texas Ph. Mission 5-2484 • *Elizabeth, N. J. Ph. ELizabeth 4-6244. IN CANADA: CROSE-CURRAN LTD., *Edmonton, Alberta; *Toronto and *Ft. William, Ontario — *Warehouses in 6 locations.

CALL OR WRITE CROSE TODAY FOR COMPLETE DETAILS.



RESULTS OF FIVE BURST TESTS on 20-in. pipe dented lengthwise are plotted in several locations showing longitudinal residual and pressure stress.



TRANSVERSE STRESS PLOT for five burst tests on 20-in. pipe dented lengthwise also indicates theoretical minimum yield and theoretical curve.

TABLE 1—PRESSURE STRESS AND RESIDUAL STRESS SUMMARY FOR 20-IN. O.D. API-5LX42 PIPE

Gage line	Average residual stress in psi.	1,000-psig. pressure stress in psi.	Total stress at 1,000 psig. in psi.	1,200-psig. pressure stress in psi.	Total stress at 1,200 psig. in psi.
25-L	11,126	31,651	42,777	37,458	48,584
25-T	24,067	— 4,525	19,542	6,653	30,720
25'-L	— 9,827	.....	.....	.....	.....
25'-T	—26,428	.....	.....	.....	.....
0-L	23,053	Yield	>Yield	>Yield	>Yield
0-T	27,397	Yield	>Yield	>Yield	>Yield
0'-L	—28,772	.....	.....	.....	.....
0'-T	—22,553	.....	.....	.....	.....
3-L	7,688	22,351	30,039	28,883	36,571
3-T	22,623	—23,583	— 960	— 8,126	13,497
3'-L	— 9,327	.....	.....	.....	.....
3'-T	—22,834	.....	.....	.....	.....
7-L	— 168	16,144	15,976	21,218	21,050
7-T	5,306	37,306	42,612	49,063	54,369
7'-L	2,164	.....	.....	.....	.....
7'-T	— 2,061	.....	.....	.....	.....
14-L	—21,703	31,850	10,153	37,485	15,782
14-T	—12,718	56,721	44,003	67,116	54,398
14'-L	— 2,154	.....	.....	.....	.....
14'-T	10,579	.....	.....	.....	.....
21-L	9,686	16,538	26,852	27,765	37,451
21-T	4,391	15,110	19,501	19,911	23,892
21'-L	14,890	.....	.....	.....	.....
21'-T	728	.....	.....	.....	.....

superposing a force on the deformed location due to elastic action.

The strain readings obtained in the center of a sharp dent on the 26-in. pipe indicated the residual stress in the center of the dent on the exterior surface of the pipe was 45,300-psi. compression in the transverse direction and 20,700-psi. compression in the longitudinal direction.

It appears that all the residual stress in the continuous dent in the 20-in. pipe was due to bending moment. The values of the residual stress are shown in Table 1. The residual stresses are such that internal pressure may or may not decrease the locked-up stress depending on the change in curvature.

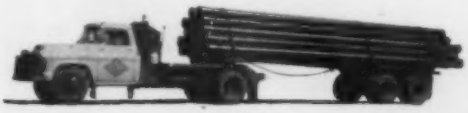
The full significance of residual stresses are not completely understood. But it would appear in calculating the stress in the dent and other locations, as the pressure is increased in the pipe, the residual stress should be added algebraically to get the true stress.

The transverse residual stresses in the various portions of the dent were approximately the same absolute value, averaging 24,694 and —23,938. The maximum longitudinal residual stress occurred at the center of the dent. The average residual stresses and the

Congrats and $25 to D. H. CROWELL, 5919 Vickery Blvd.. Dallas. Texas, for this quip.

There's no use fishin' around on pipe purchases . . when Lone Star pipe is so close at hand and so economical in the long run.

Lone Star API casing, tubing and line pipe represent steel pipe at its best. Exacting multiple tests assure the toughness . . the stamina . . the long service that the oil and gas industry demands. Joe Roughneck knows that Lone Star has every step of pipe-making under control . . quality control . . from mining of ore to finished pipe.



Neighbor, wherever you are, specify Lone Star and we both get a good deal.

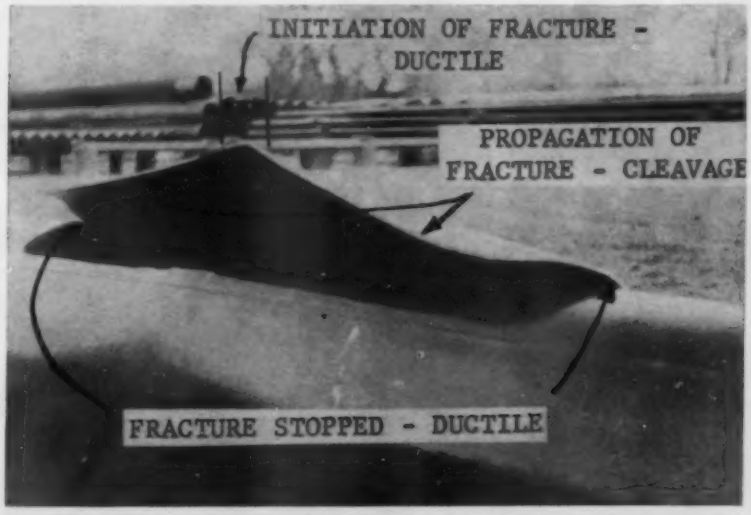
Lone Star STEEL COMPANY

EXECUTIVE—SALES OFFICES
W. Mockingbird Lane at Roper • P. O. Box 12226 • Dallas, Texas
DISTRICT SALES OFFICES
912 Republic National Bank Building, Dallas, Texas
Houston, Texas | Midland, Texas | Tulsa, Oklahoma

©1956 Lone Star Steel Company

TABLE 2—SUMMARY OF BURST TESTS

Test piece	Length of test piece	Bursting Pressure (psig.)	Bursting Stress (psi.)	Length of fracture (in.)	Point of initiation
100	14 ft. 10 in.	1,725	69,000	57	Adjacent to longitudinal weld
101	15 ft. 11 in.	1,660	66,400	62	Approximately midway between seam and dent
105	23 ft. 0 in.	1,680	67,200	119	Adjacent to longitudinal weld
108	21 ft. 10 in.	1,580	63,200	56	Adjacent to longitudinal weld
109	11 ft. 8 in.	1,720	68,800	50	Adjacent to longitudinal weld



TYPICAL FAILURE of dented 20-in. pipe shows characteristics of normal pipe bursting.

stress obtained at an internal pressure of 1,000 psig. from the pressure tests have been combined in Table 1 to give an idea of the total stress near yield pressure (1,050 psig.).

The summary at 1,000 psig. and 1,200 psig. does not give precise totals because the deformation in the pipe of the residual stress test and the pipe of the pressure stress test are not identical. But it is a fairly reasonable indication of what happens.

Burst Tests

Five burst tests were made on the 20-in. cold-expanded continuously dented pipe which varied in length from 14 ft. 10 in. to 23 ft. A series of measurements was made across the diameter before testing the damaged pipe in order to determine the depth of the dent.

Another series of measurements was made on all samples after testing to determine how much of the dent was removed from the pipe as a result of internal pressure.

Strain gages were installed on the external surfaces of the 20-in. dented pipe (11 ft. 8 in. in length). A 4-in.-wide strap was placed around the pipe at one end to restrain the dent and to stimulate the effect of soil restraint on the dent.

The strap was placed around the pipe but not welded to the pipe to see if failure would initiate from the dent, if restrained. The failure initiated at the opposite end of the pipe section from the strap. The strap restrained expansion of the pipe, but the pipe expanded on both sides of the strap.

Four of the five failures in these tests occurred at pressures slightly above the calculated ultimate stress of 66,000 psi. and bursting pressure of 1,656 psig. for this pipe, as shown in Table 2. The only explanation for the pipe breaking near the weld is possibly the difference in physical properties in the dent and heat-affected zone.

Since the heat-affected zone did not have the ductility of the unaffected base metal, it probably was not able to withstand as much yielding as the remainder of the pipe. It is interesting to surmise that if this pipe were seamless, the failure may be reasonably expected to occur in the dent.

It was observed during the burst tests that the internal pressure pushed the dent out and it was completely removed at pressures varying from 850 to 1,200 psig.

The center of the dent was the only overstressed area and yielding occurred below 190 psig. in the transverse direction as indicated by strain-gage readings. The residual stresses, the pressure stress at 1,000 psig. and 1,200 psig., and their combinations are shown in Table 1.

BOOKS

DOCUMENTATION AND INFORMATION RETRIEVAL; AN INTRODUCTION TO BASIC PRINCIPLES AND COST ANALYSIS. By J. W. Perry and Allen Kent. Published by Western Reserve University Press and Interscience Publishers, Inc., 250 Fifth Avenue, New York, 1. 156 pp. $5.

The art of classifying, indexing, and abstracting is discussed in this book in engineering terms.

The practical necessity of coping with information problems in recent years has resulted in much time and effort being devoted to development of new methods and techniques.

The authors explain that this volume "has been written in the conviction that mathematical formulation of basic principles together with cost analysis of procedures and operations will permit the development of information systems to be placed on a firm engineering basis. . .

"The present monograph is accordingly directed to a basic theory of information retrieval and correlation."

The book outlines a mathematical model system, discusses selectivity criteria for systems evaluation, analysis of cost factors, correlation of methods and systems, and gives a resume of systems design.

RESEARCH STUDY OF SHUT-IN GAS WELLS IN RAILROAD COMMISSION DISTRICTS 1, 2, 3, and 4. Published by Austin Oil & Gas Publishing Co., P. O. Box 5146, West Austin Station, Austin, Tex. $80.

A complete list of approximately 3,000 shut-in gas wells in the South Texas and Texas Gulf Coast area has been compiled and published from the records of the Railroad Commission of Texas. This report presents the following information: Railroad Commission district, county, field, operator, lease, well number, survey, date of completion, perforation interval, formation or reservoir tops, pressures, and gravity of gas-potential test.

The data was assembled from a study of some 25,000 ledger sheets, standardized and indexed as reported through December 31, 1957.

EPOXY RESINS by Henry Lee and Kris Neville. Published by McGraw-Hill Book Co., New York, $8.

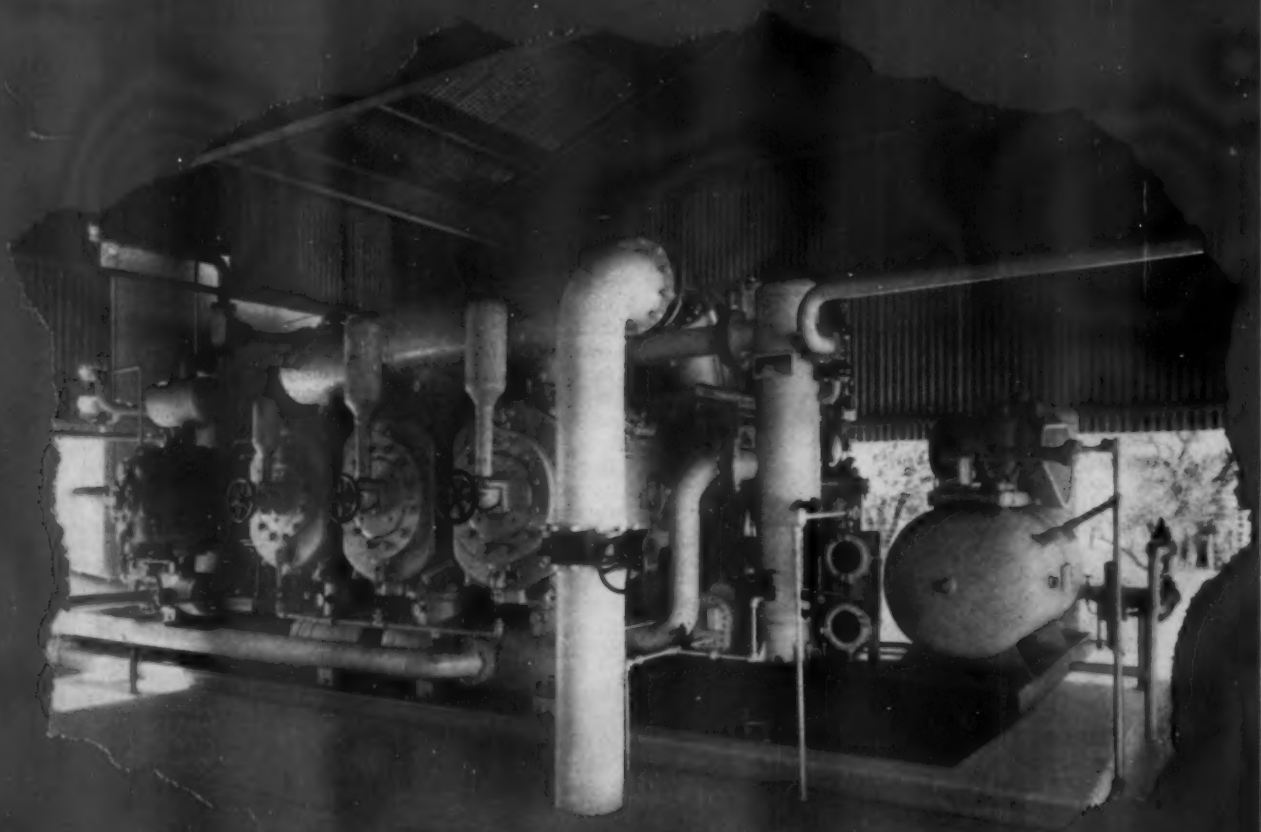
This is a comprehensive guide to the field of epoxy resins covering their preparation and industrial applications.

Emphasis is on engineering versatility of the epoxies—their range and potentialities.

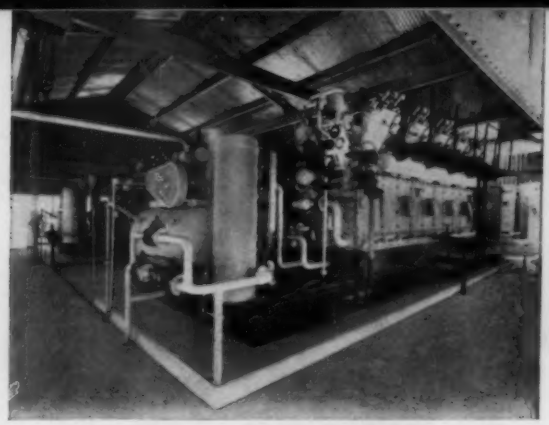
There is information on their synthesis and curing mechanisms, curing agents and fillers and modifiers.

Note: The Oil and Gas Journal maintains a book department. Write to the READER SERVICE DEPARTMENT, P. O. Box 1260, Tulsa 1, for copies of the book list. Often books reviewed here may be purchased from this source.

Packaged and Unattended



One of two Cooper-Bessemer GMVH-8 compressors at the Wright Wells Texas gas booster station pumps gas from 7 to 20 psig and discharges at 150 psig.



Packaged and skidded . . . 10-cylinder Cooper-Bessemer compressors rated 660 hp at 450 rpm in service for Cities Service Oil Company.

Photo courtesy Southwest Industries.

..for top economy in field booster service

Here, in the Wizard Wells station of Cities Service Oil Company, Cooper-Bessemer completely packaged, pre-piped GMXD compressor plants boost field gas to the Chico, Texas gasoline plant.

Combining extreme compactness and high compressor efficiency with positive safety-check devices, these versatile packaged compressors permit the economies of unattended operation, minimum installation cost and easy, inexpensive relocation should the need arise.

Be sure to learn more about the long list of long-term savings with Cooper-Bessemer compressor equipment. Write for comparative cost figures.

BRANCH OFFICES: Grove City • New York • Chicago • Washington • San Francisco • Los Angeles Houston • Dallas • Odessa • Pampa • Greggton • Seattle • Tulsa • St. Louis • Kansas City Minneapolis • New Orleans • Shreveport.

SUBSIDIARIES: Cooper-Bessemer of Canada, Ltd. . . . Edmonton • Calgary • Toronto • Halifax. Cooper-Bessemer International Corporation . . . New York • Caracas • Mexico City.

Cooper Bessemer

GENERAL OFFICES: MOUNT VERNON, OHIO

ENGINES: GAS - DIESEL - GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL
ENGINE OR MOTOR DRIVEN

W-K-M *Creative Engineering* sets the industry standard for Through-Conduit Gate Valves

W-K-M
Recessed Body Valves
for Dual Completion Christmas Trees

These recessed body valves illustrate how W-K-M's creative engineering solves your problems. The recessed body was achieved without impairing the efficiency of the typical W-K-M design. These valves give you the benefits of W-K-M's parallel expanding gates, controlled force seating, free flow through the valve without turbulence or pressure drop, and can be completely overhauled in the line.

Sizes: 1½", 1¾", 2", 2½" and 3". Working pressures, 2000 pounds to 5000 pounds.

WRITE FOR CATALOG 200

The creative engineering behind W-K-M Through-Conduit Gate Valves sets industry standards for design . . . dependability . . . easy operation . . . long life and low maintenance costs. Quality of workmanship and material is rarely duplicated, never surpassed. In the field, service is prompt, skilled and helpful.

ON HAND. The most used sizes of W-K-M Gate Valves are carried by supply stores everywhere. Special sizes and special designs are produced as you need them.

W-K-M

DIVISION OF ACF INDUSTRIES
INCORPORATED
P. O. BOX 2117, HOUSTON, TEXAS

5809

Wetting agent reduces pipe sticking

BY NORMAN K. TSCHIRLEY AND KENNETH D. TANNER
Baroid Division, National Lead Co.

NORMALLY, we talk about the quality of an emulsion mud only in terms of:

1. Volume per cent of oil.
2. Presence or absence of free oil in the filtrate or free oil on the surface of the pits.

We ordinarily judge an emulsifier by its ability to keep oil emulsified in a given mud at the lowest cost—while at the same time causing no bad side effects.

This article deals with three muds which were already considered good emulsions, but to which was added a wetting agent. As a result of this wetting agent, pipe drag was eliminated in the three wells.

The wetting agent is primarily a polyoxyethylene sorbitan tall-oil ester.* It is an oil-dispersible, nonionic surfactant with an HLB number of about 13. This same material has been used for some time to promote settling of cuttings from oil-in-water emulsion muds. The three wells mentioned above showed that this wetting agent is not limited to its original use in low-solids muds. It can be extended to other emulsion muds to improve oil-wetting action. The three mud systems were also a demonstration of how filtration can be reduced by using oil in conjunction with emulsifiers that form different types of emulsions.

*Distributed by Baroid division, National Lead Co., under tradename of Trimulso.

Use of wetting agents to overcome wall sticking of pipe was first implied in an article by Helmick and Longley of Shell Oil Co.[1] The wetting agent was first actually tried for this purpose on a well in the Rio Grande Valley of South Texas where there had already been differential sticking. All three wells used weighted lime emulsion mud when tight-hole trouble began.

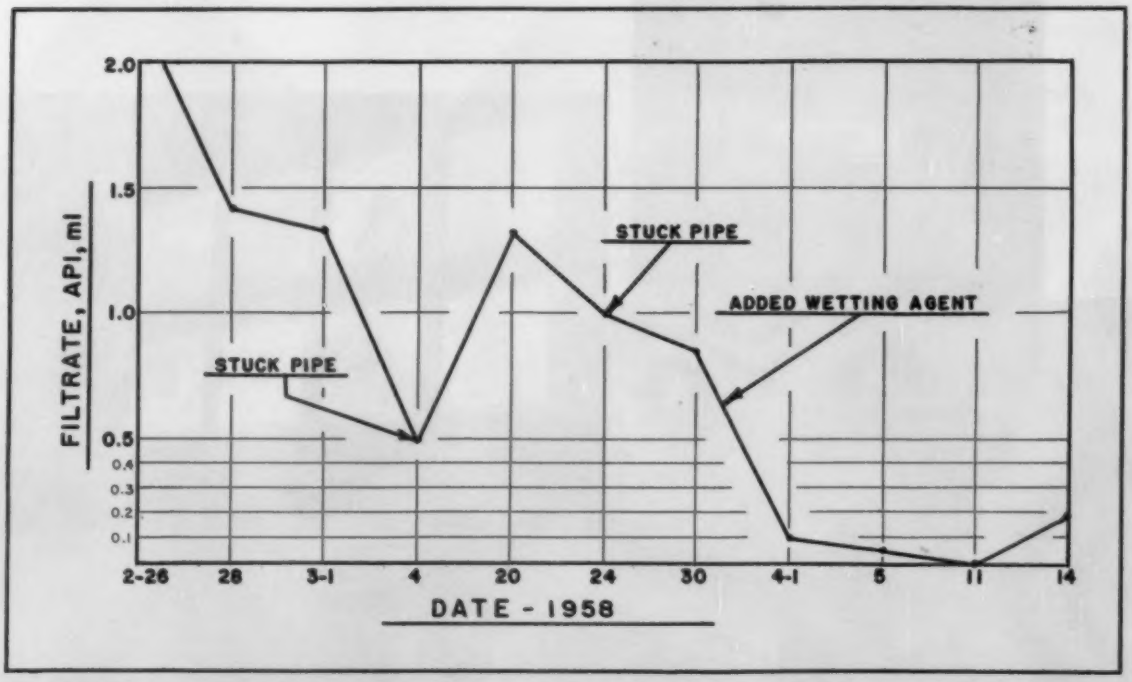
What wetting agent does . . . In this special application, the purpose of the wetting agent is to promote oil coating (wetting) of the surfaces of mud solids and the drilling tools. This same objective has been approached by using tall-oil soap as an emulsifier.[2] Before this, this same wetting agent had been limited in use to low-solids oil-in-water emulsion muds. Mud properties before and after addition of the wetting agent to the lime muds showed no major changes other than:

1. The API filtrate loss was markedly lower.
2. The filtrate contained both water and oil when the mud was filtered under higher temperature and pressure.
3. There was a film of oil on the filter cake from API or high temperature-pressure filtration.
4. A film of oil formed on the surface of the mud in the pits.

Well "A"

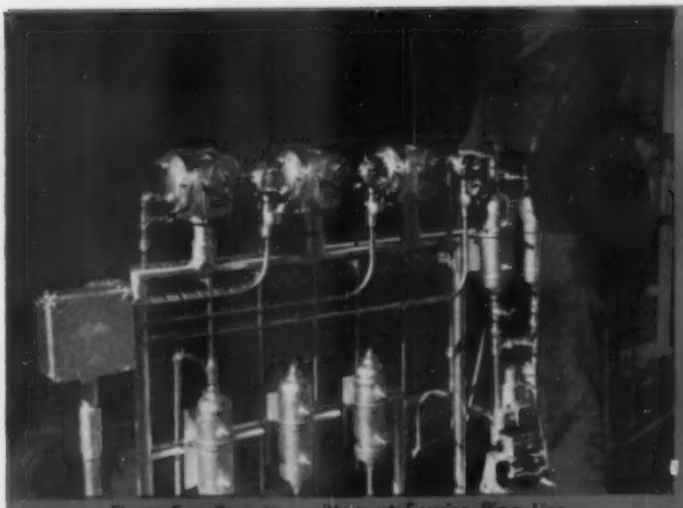
This well was cased to 10,000 ft., but there was trouble with stuck pipe between 10,500 and 10,700 ft. The first two times the pipe stuck, it was freed by spotting oil. The third time, oil would not free the pipe.

The pipe stuck while running a slope survey. Approximately 3 weeks were spent fishing, and several drill collars and joints of wash pipe were left in the hole. The hole was deviated past the fish and drilling proceeded

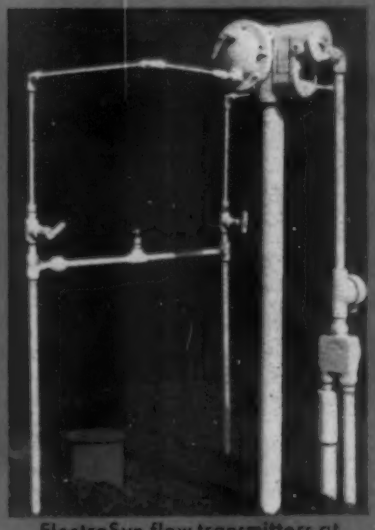


THIS RECORD is for the well that started use of wetting agents to prevent wall sticking. The line shows API filtration rates during the drilling of well "A." After the wetting was added, there was no more stuck pipe.

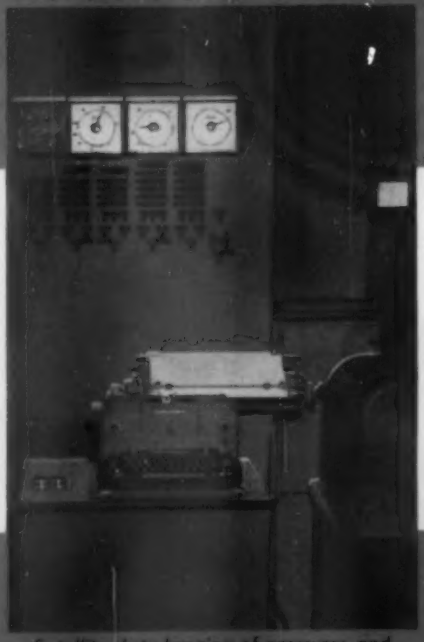
pressure and flow data



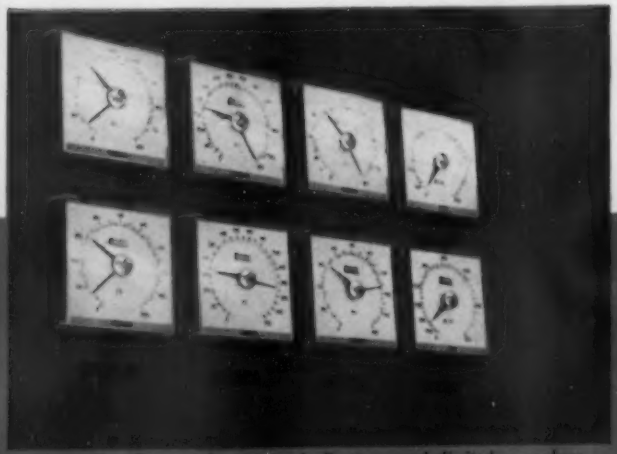
ElectroSyn flow transmitters at Service Pipe Line Company's pumping station, Drumright, Oklahoma.



ElectroSyn flow transmitters at Service Pipe Line's Blake Station (Washington County, Oklahoma).



Satellite data logging of pressures and flows at Drumright Station.



ElectroSyn flow and pressure indicators and digital encoders at Blake Station.

3 to 4 times more accurate with

NORWOOD CONTROLS **ELECTROSYN**

Norwood Controls' ElectroSyn digital telemetering transmitters are playing an important part in digital data handling for leading pipeline companies. The ElectroSyn System's digital approach automatically makes available — for logging — pressure and flow information with 3 to 4 times greater accuracy than can be attained by use of analog equipment. This increased accuracy results in considerably higher overall operating efficiency.

Digital pressure and flow values are transmitted in encoded form from pumping stations along the line to central logging points by data handling and checking equipment.

The ElectroSyn null-balance System consists of electro-magnetic transmitters and feedback units combined with magnetic amplifiers. Servo-indicators actuate adjustable high and low alarm contacts which are visible and can be set from the front of the instrument. Shaft positions of the servos are read out by encoders . . . linear encoders for pressure and square law encoders for flow. Additional encoders can be actuated to provide rate-of-change alarms.

More and more pipeline companies are choosing ElectroSyn Systems because they offer:

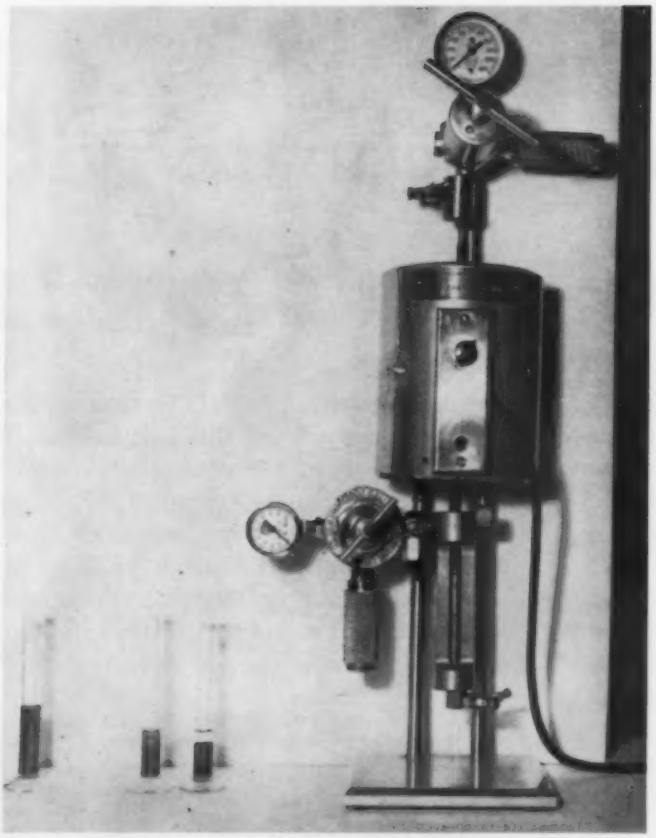
- Higher reliability
- Lower maintenance
- Flexibility of application
- Rugged electro-magnetic system
- Can withstand static overload of 200% of rated pressure with no zero shift
- Remote transmission
- Explosion-proof transmitters.

Write for ElectroSyn Bulletin B257 — Norwood Controls Unit, Detroit Controls Division, 942 Washington St., Norwood, Mass.

AMERICAN-Standard PRODUCTS

AMERICAN-Standard

DETROIT CONTROLS DIVISION



FILTRATES from the mud on well "A" collected at 200° F. and 500 psi. Graduate on the left holds material as it was before addition of wetting agent. Two graduates on the right contain filtrates collected after the wetting agent was added. Filtrate is an emulsion when there is an adequate concentration of wetting agent in the mud.

for about 300 ft. when the pipe stuck again, while running a slope survey. This sticking of the pipe was attributed to the pressure differential between mud hydrostatic head and formation fluids. This diagnosis was based on the following observations:

1. The pipe stuck only after the drilling string remained motionless for several minutes.

2. There were no indications of tight hole, sloughing, or other obstructions on trips.

TABLE 1—MUD PROPERTIES BEFORE AND AFTER TREATMENT, WELL A

	Before	After
Weight, parts per gal.	14.0	14.1
Viscosity, seconds	70	67
Viscosity, cp.	89	87
Initial gel strength	0	0
10-minute gel strength	7	10
pH	12.7	12.7
Filtrate, API, ml.	1.1	0.1
Cake, in.	2/64	1/64
Filtrate, 200° F., 500 psi, ml.:		
Emulsion	0	4.0
Water	5.8	3.0
Oil	0	1.0
Cake, in.	3/32	1/32
Pm, API	10	11

3. Filtration properties of the mud indicated that there was no excessive wall cake buildup, even under high temperature and pressure.

4. Formations exposed were predominantly sand, providing permeable zones.

5. Upon removal of the wash pipe after washing over the stuck drill pipe, resticking occurred before the drill pipe could be recovered.

6. Spotting of oil would sometimes free the pipe.

7. Mud circulation was not hindered when the pipe was stuck.

What to do . . . It was thought that the drilling tools and mud solids should be oil-coated. This would lengthen the time required for an area on the drill pipe to become isolated against the wall of the hole and thus reduce the magnitude of the differential pressure forcing the pipe against that wall.

In an attempt to get the oil wetting, 800 gal. of the wetting agent and 40 bbl. of diesel oil were added to the mud. The materials were added together through the hopper. Treatment was equivalent to ¾ gal. of wetting agent per barrel of mud or 5 gal. of wetting agent per barrel of diesel oil in the mud. Table 1 shows mud properties before and after treatment.

TABLE 2—MUD PROPERTIES BEFORE AND AFTER TREATMENT, WELL B

	Before	After
Weight, parts per gal.	16.5	16.4
Viscosity, seconds	88	68
Plastic viscosity, cp.	76	49
Yield point, lb./100 sq. ft.	34	36
10-minute gel strength	3	2
Filtrate, API, ml.	3.4	2.6
Chloride, p.p.m.	2,900	2,500
Pf, API, ml.	8.0	7.0
Pm, API, ml.	16	13
Oil, % by volume	10	10
Solids, % by volume	42	39
Water, % by volume	48	51

Drilling progressed from 10,602 ft. where the wetting agent was added, to total depth of 11,500 ft. with no further hole trouble. This relief from differential sticking was attributed to two things: (1) oil wetting of drilling tools and mud solids; and (2) the reduced rate of filter-cake deposition resulting from an extraordinarily low filtration rate.

Well "B"

To improve hole conditions, the mud was treated with about 4 gal. of wetting agent per barrel of mud. The addition was made through the hopper along with diesel oil in a volume ratio of about 6 gal. of agent per barrel of oil. Table 2 shows mud properties before and after the treatment. Drilling was continued from this point (12,520 ft.) to total depth (13,370 ft.) with no further pipe drag. Casing was set and cemented without loss of circulation.

Well "C"

The hole had been drilled to casing depth (6,510 ft.). The lime emulsion mud in use at the time weighed 12.8 lb. per gal. and contained 12% oil by volume. Viscosity was 45 seconds, gels were zero-zero, and API filter loss was 3.2 ml. Bottom could not be reached with a wire-line tool and a subsequent caliper log showed restricted sections in the hole.

Obstruction to free movement of the drill pipe was noted while tripping to clean up the hole. Approximately ¼ gal. of wetting agent per barrel of mud was added. Additional wire-line tools as well as casing were then run without difficulty. It appeared that less water addition was needed to control viscosity while drilling below casing than would normally have been expected.

References

1. "Pressure-Differential Sticking of Drill Pipe," by W. E. Helmick and A. J. Longley, The Oil and Gas Journal, June 17, 1957.

2. "Drilling Fluids Study on Gulf Coast Fields," by J. F. Weichert, Petroleum Engineer, Sept. 1952.

Sour crudes won't corrode this pipe

Oil industry uses Tenite Butyrate plastic pipe for trouble-free service

Millions of feet of pipe made of Tenite Butyrate are now in use in the petroleum industry, and the demand for this pipe is steadily increasing.

Why?

The original reason for Butyrate's popularity was its ability to withstand corrosion—caused by sour crudes, salt water and alkali soils. Buried or exposed to the weather, pipe made of Tenite Butyrate gives long years of trouble-free service.

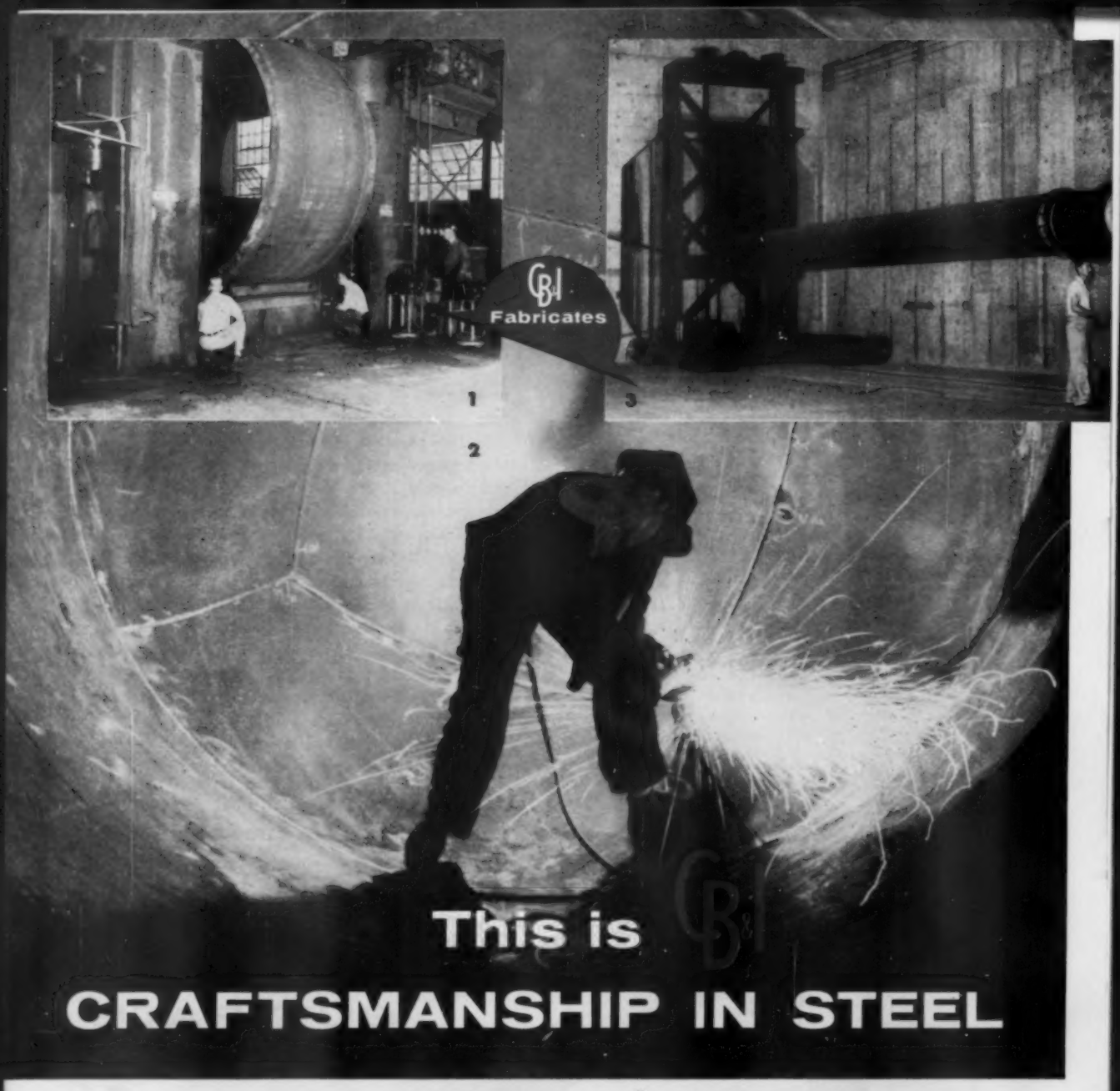
But this pipe has other unique advantages too. It is amazingly light in weight; a 20' length of 4" pipe weighs only 20 lbs. Its glass-smooth walls resist paraffin accumulation; cleaning shutdowns are virtually eliminated. This smoothness also provides as much as 40% greater flow volume for any given head loss than does clean metal pipe of the same diameter. Rapid joining is accomplished with slip-sleeve couplings and solvent cement.

Why not find out more about pipe of Tenite Butyrate? Perhaps you can take advantage of the benefits that this pipe is providing to so many others in the petroleum industry.

Write us for additional information, and also for the names of suppliers of pipe and a complete range of fittings made of Tenite Butyrate plastic. Address: EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

A 16-mm. sound-color film, "PLASTIC PIPELINES," is available upon request.

TENITE
BUTYRATE
an Eastman plastic



Precise engineering and EXPERIENCE mark CB&I Coordinated Services

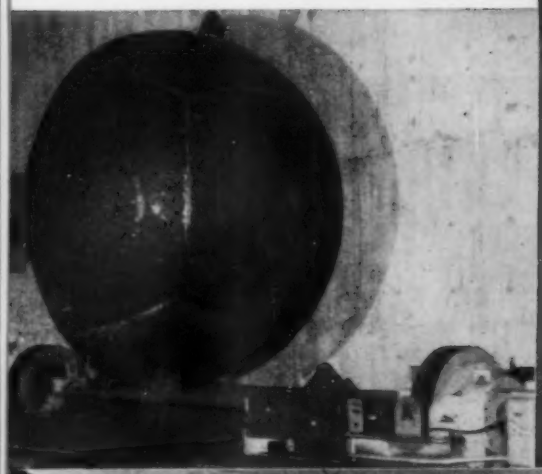
Almost 70 years of specialization in the design, engineering, fabrication and erection of steel plate structures will build long and efficient performance life into your next CB&I-built structure. *Here's why:*

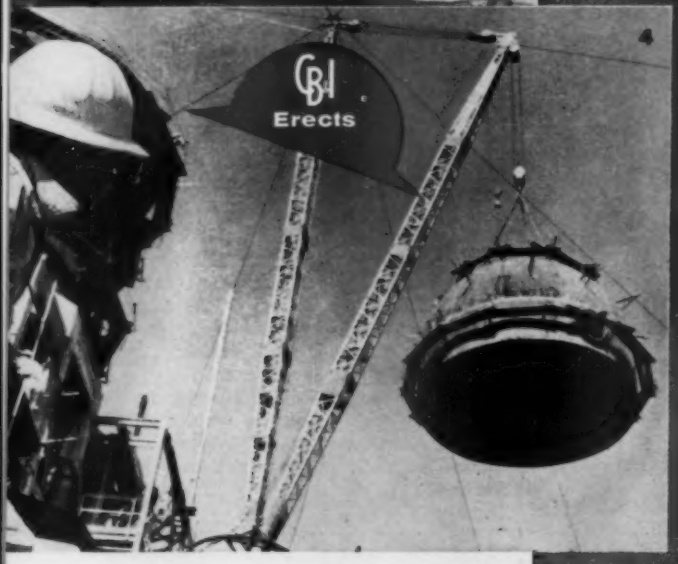
CB&I Engineers. From first contact with the customer through final testing, CB&I's general engineering staff supplies technical guidance to the CB&I team. Important coordination between fabricating, erection and testing is thus insured.

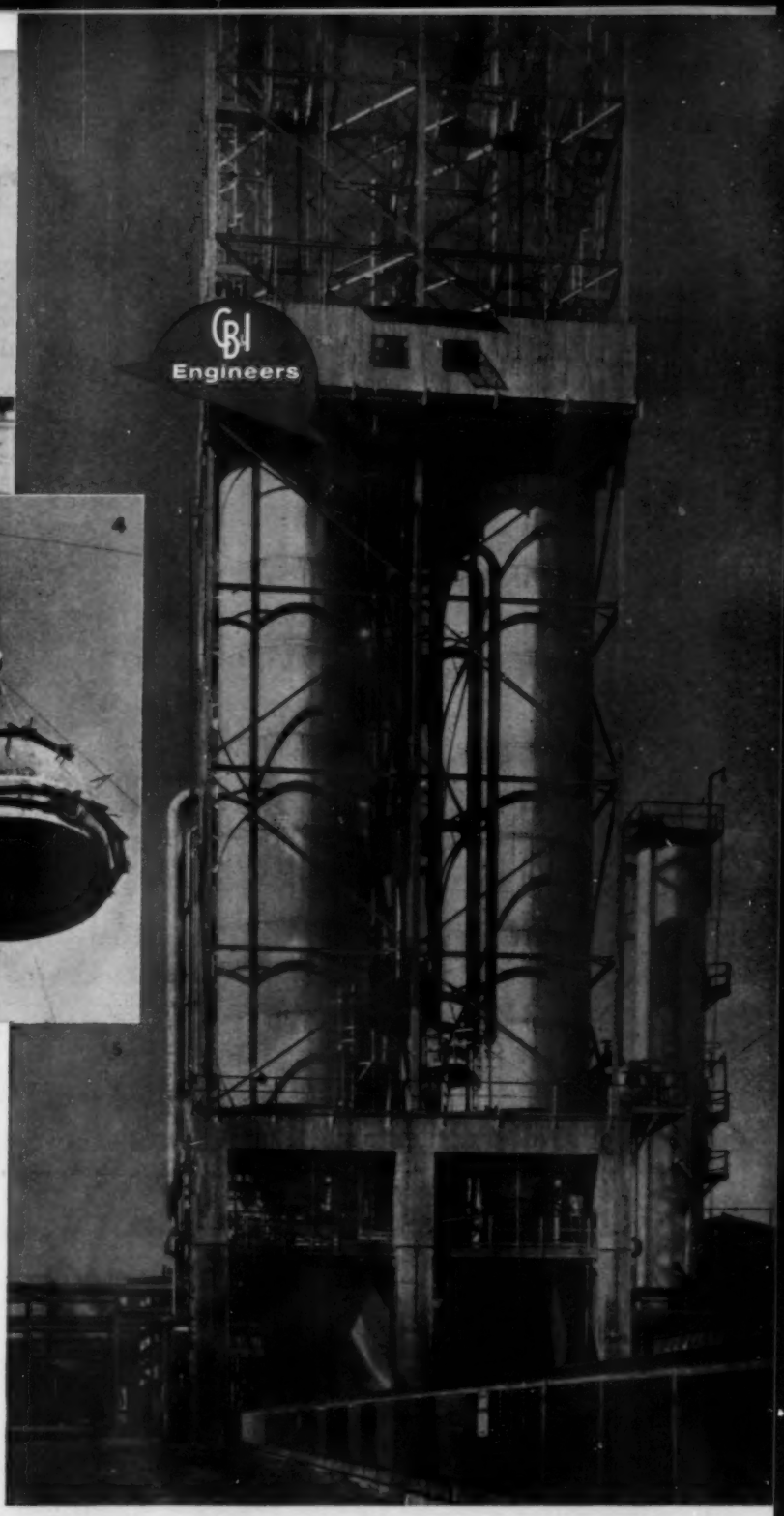
CB&I Fabricates. The finest manufacturing facilities —(including X-ray and stress relieving)—backed by metallurgical techniques and testing facilities second to none—are maintained in four strategically located and fully equipped fabricating plants.

CB&I Erects. Skilled, responsible crews work with up-to-date equipment. Field X-ray and stress relieving equipment, in addition to CB&I-developed welding techniques, are an important part of their trade. Experience in a wide variety of metals, including stainless, nickel, aluminum and clad materials are also part of the service that has earned CB&I a *global* reputation for erecting on a *world-wide* basis.

These coordinated services are what you receive when you contract for a CB&I-built structure. CB&I customers have learned to expect and get top rated performance and maximum service life from *CB&I craftsmanship in steel.* Write our nearest office for details. Ask for the CB&I Bulletins on: *Special Plate Structures* and *CB&I Field Services.*







1 5-in. thick plate for reactor is fabricated at CB&I's Birmingham plant.

2 Workman smooths seams on an assembled section.

3 X-ray machine checks seam welds. Machines operating at 1,000,000 and 2,000,000 volts are used to completely inspect steel vessels as much as 10 inches thick.

4 72-ton top section for reactor-regenerator is lowered into position under supervision of CB&I erection specialist.

5 405 STAINLESS STEEL HORTONCLAD® coking chambers were fabricated and erected by CB&I for a Kansas refinery. Stainless is backed by A204 Grade A moly steel.

Hortonclad®, developed by CB&I, is a composite metal having an integral and continuous bond produced by a high vacuum bonding process. It is available only in CB&I fabricated tanks, pressure vessels and other clad structures.

P725C8

Chicago Bridge & Iron Company

Plants in: BIRMINGHAM, ALA. • CHICAGO, ILL. • GREENVILLE, PA. • SALT LAKE CITY, UTAH • NEW CASTLE, DEL.

REPRESENTATIVES, LICENSEES and SUBSIDIARIES: Australia—Bernard-Smith (Pty.) Limited, Alexandria (Sydney); Evans Deakin & Co. Ltd., Brisbane • **Canada**—Horton Steel Works Limited, Toronto • **Cuba**—W. P. Bryant, Edificio Abreu 402, Havana • **Brazil**—Sociedade Chibridge de Construcoes Ltda., Rio de Janeiro • **England**—Chicago Bridge Limited, London; Whessoe Limited, Darlington • **France**—Constructions Metalliques de Provence, Arles-sur-Rhone; S. A. Ateliers et Chantiers de la Seine Maritime, Le Trait • **Germany**—Wilke-Werke AG, Braunschweig; Gutehoffnungshutte, Oberhausen-Sterkrade • **Italy**—Compagnia Tecnica Industrie Petroli, Rome • **Japan**—Ishikawajima Heavy Industries Co., Ltd., Tokyo • **Netherlands**—Comprimo N. V., Amsterdam • **Scotland**—The Motherwell Bridge & Engineering Co., Ltd., Motherwell • **Venezuela**—Chicago Bridge & Iron Company Ltd., Caracas

OFFICES: Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston • Kansas City (Mo.) • New Orleans
New York • Philadelphia • Pittsburgh • Salt Lake City • San Francisco • Seattle • South Pasadena • Tulsa

Downhole power speeds drilling

BY ROSS W. COLEBROOK

IT NOW APPEARS that downhole mud-operated devices such as jet bits, reciprocating motors, or turbines, or positive-displacement rotating motors can increase the hydraulic power used at the bottom of the hole.

The amount of hydraulic power at the bottom of the drill string depends on both the mud system and the downhole device which the mud operates. To get the highest downhole hydraulic power, we must have:

1. The mud-system losses reduced as much as possible.
2. The downhole device matched to the rest of the system.

Mud-system losses are reduced by using tubular material with the largest possible bore and by using the lightest mud which hole conditions permit. The surface mud pressure should be the highest which can be maintained economically, as pressure contributes to the power but not to the mud-system losses.

The downhole mud-operated device matches the rest of the system when it has the right pressure drop at an optimum mud-flow rate. There is a big difference in the pressure drop of different devices. An open bit has practically no pressure drop even at very high mud-flow rates. A jet bit with very small nozzles can have such a high pressure drop that the maximum economic mud pressure is reached at a very low mud-flow rate. The pressure drop and mud-flow rate for the highest downhole hydraulic power are between these extremes.

Author is development engineer, National Supply Co., Houston. Paper presented at thirteenth petroleum-mechanical conference of ASME, Denver.

Best pressure drop . . . The pressure drop across the bit or other device on the bottom of the drill string has a considerable effect on the downhole hydraulic power. Here is an example:

In West Texas, a rig could be found drilling an 8¾-in. hole at 10,000 ft. using jet bits. The maximum economic mud pressure might be 2,500 psi. When mud-flow rate increases, the pump power always increases. The hydraulic power at the bit first increases with increased flow rate, then decreases. Hydraulic power at the bit is maximum when the pressure drop across the bit is about two-thirds of the maximum economic mud pressure.

The appendix presents an approximate equation which shows that the downhole hydraulic power is always highest when the pressure drop across the device on the bottom of the drill string is about two-thirds of the maximum economic mud pressure.

We can conclude from this:

1. With any given hole dimensions, mud weight, drill string, and mud-pressure limitation, there is a maximum hydraulic power which can be achieved at the bottom of the drill string.
2. To get the maximum hydraulic power, the device on the bottom of the drill string must operate with a mud-flow rate and a pressure drop dictated by the rest of the system. The pressure drop must be about two-thirds of the maximum economic mud pressure.

The best mud-flow rate . . . The mud-flow rate which produces the maximum hydraulic power at the bottom of the drill string varies with the dimensions of the drill string and the hole, the weight of the mud, and the maximum economic mud pressure. It is given by the approximate equation:

$$Q_{opt} \sim \left[\frac{P_{limit}}{2.9K_1} \right]^{0.53} \qquad (1)$$

where

Q_{opt} = best mud flow rate, g.p.m.
P_{limit} = maximum economic mud pressure, psi.
K_1 = a function of hole and pipe dimensions, and mud weight.

The appendix gives the derivation of this expression.

There is a great difference in the best mud-flow rate for different types

How to get the most power to the bottom of the hole

1. Hydraulic power at the bottom of the drill string is highest when:
   (a) Bore through the drill string is the largest practical.
   (b) Mud weight is the lightest that is safe.
   (c) Surface mud pressure is the highest which can be maintained economically.
   (d) Mud-flow rate and pressure drop across the downhole mud-operated device are optimum.
2. The best pressure drop across the downhole device is about two-thirds of the surface mud pressure.
3. The optimum mud-flow rate is a function of pipe and hole dimensions, mud weight, and surface pressure.
4. Under optimum conditions, downhole hydraulic power is about two-thirds of the surface hydraulic power.
5. Good jet-drilling practice conforms closely to these conditions. Thus, downhole power can be raised for jet drilling only when higher pump pressures, lighter muds, or larger-bore drill strings become practical.
6. The result will be higher surface mud pressure if the downhole mud-operated device has a pressure drop higher or lower than the optimum. When the pressure drop is lower than optimum, the pump power required is also higher.
7. Pump power varies as the 1.53 power of the system pressure for maximum downhole power. Therefore, systems now using about 1,600 hydraulic horsepower will require 3,500 hydraulic horsepower when it's possible to use 5,000-psi. mud pressure.

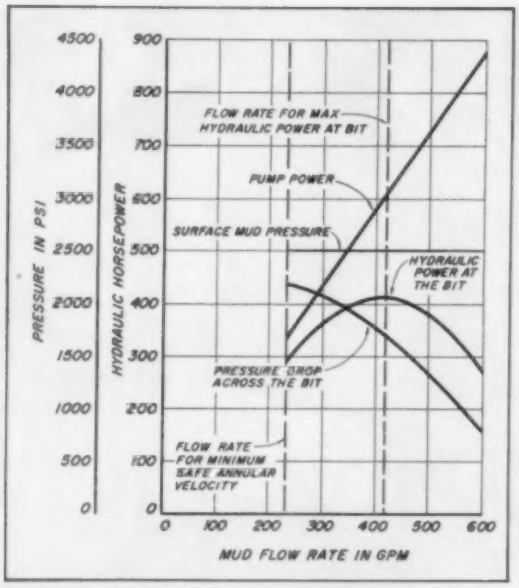
The 175 ft. high Isobutane Fractionating Tower of The British Petroleum Company's new Alkylation Plant at Isle of Grain.

Britain's first alkylation plant goes on stream

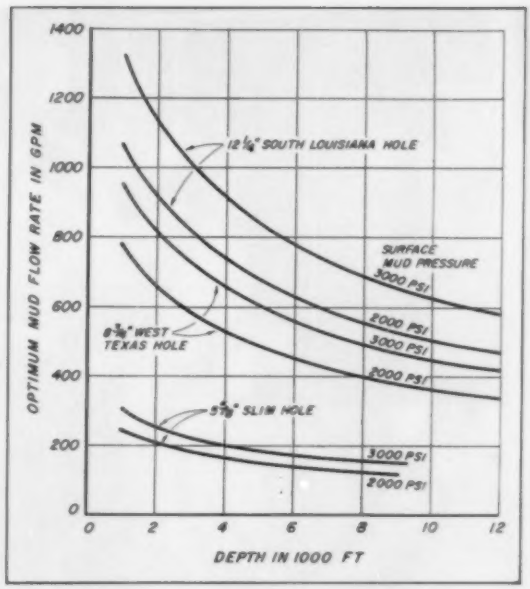
The technician twists the valve that recently set Britain's first alkylation plant 'on stream'. This plant is part of The British Petroleum Company's Kent Refinery on the Isle of Grain. This BP Refinery now has the only complete unit for making Avgas in Britain. The new plant will produce 40 million gallons of Avgas a year.

BP

THE BRITISH PETROLEUM COMPANY LIMITED


PRESSURE IN PSI
HYDRAULIC HORSEPOWER
FLOW RATE FOR MAX HYDRAULIC POWER AT BIT
PUMP POWER
SURFACE MUD PRESSURE
HYDRAULIC POWER AT THE BIT
PRESSURE DROP ACROSS THE BIT
FLOW RATE FOR MINIMUM SAFE ANNULAR VELOCITY
MUD FLOW RATE IN GPM

EFFECTS of changing mud-flow rate, while keeping 2,500-psi. mud pressure by changing bit-nozzle sizes.



VARIATION of maximum mud-flow rate with depth and surface mud pressure for three example holes.

of holes. The best mud-flow rate for a slim hole may be as little as one-fourth of the best mud-flow rate for a South Louisiana hole at the same depth using the same mud pressure.

The best mud-flow rate is much greater for shallow holes than for deep holes.

High pump power is required at shallow depths because of the high mud-flow rate. At less than some certain depth, the pump power called for will be greater than the pump power available. At less than this depth the downhole hydraulic power is limited by the pump power rather than by the factors involved in Equation 1. In practice this has little net effect. The actual downhole hydraulic power is high at shallow depth and this portion of the hole is usually finished in the first few days of drilling.

It was shown several years ago that when the device on the bottom of the drill string is a jet nozzle, the drilling rate is greatest when the product of flow rate times nozzle velocity is largest.[1] This product represents the impact of the mud stream on the bottom of the hole.

The impact is greatest for slightly different conditions from those for maximum downhole hydraulic power, but the differences are not large. Maximizing the downhole hydraulic power will result in an impact about 5% less than the maximum possible impact under the same conditions. The general conclusions about a system for maximum downhole hydraulic power also apply to systems in which impact is maximized.

Transmission efficiency . . . The efficiency with which hydraulic power is transmitted downhole is equal to the ratio of the pressure drop across the downhole device to the surface mud pressure.

The downhole hydraulic power is highest when this ratio is about 0.66, with any given hole, drill string, mud weight, and surface mud pressure. The efficiency at maximum downhole hydraulic power is, therefore, about 66%. The efficiency can be made higher only if less power is acceptable.

To make the efficiency higher it is necessary to use a lower mud-flow rate and a downhole device with greater mud-flow resistance. The limiting case occurs when the downhole device will pass no mud at all. The efficiency is 100% but the power is zero.

When the pressure drop across the downhole device is less than 66% of the surface mud pressure, efficiency is less than 66% and downhole power is lower.

Devices using mud power . . . On any given rig, the best pressure drop across the device on the bottom of the drill string is likely to be constant for intervals of several thousand feet of drilling. The best pressure drop is constant because it is a fixed portion of the maximum economic mud pressure which in turn is determined by the pressure rating and maintenance costs of the mud pumps and associated equipment. Changes are not likely except when the pump-liner size is changed.

The optimum mud-flow rate varies. It is affected by changes in hole depth, mud weight, and drill-string bore as well as the maximum economic mud pressure.

Therefore, a downhole mud-operated device should be designed for a pressure drop which is essentially constant, and for a mud-flow rate which varies.

Table 1 shows how jet bits can conform to this ideal. The tabulation shows jet-bit nozzle sizes and mud-pump power needed to get maximum hydraulic power to the bottom of a 12¼-in.-hole. This is a South Louisiana-type well with 3,000-psi. mud pressure. The nozzle sizes required vary from 5/8 to 13/32 in., depending on the depth and the number of nozzles. The pump power required varies from 1,600 hydraulic horsepower at 4,000 ft. to 1,000 hydraulic horsepower at 12,000 ft.

Agree with best practice . . . It is

"It was shown several years ago that when the device on the bottom of the drill string is a jet nozzle, the drilling rate is greatest when the product of flow rate times nozzle velocity is largest. This product represents the impact of the mud stream on the bottom of the hole."

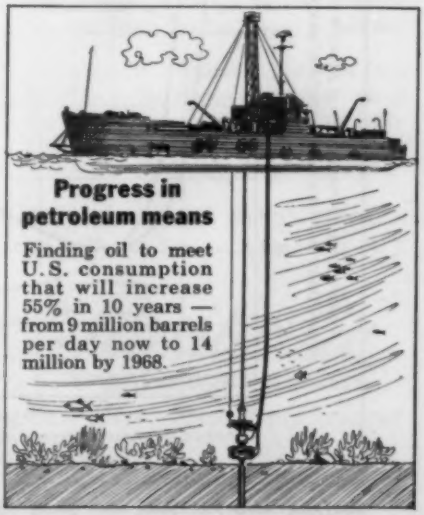
Navy landing ship converted by Standard for off-shore oil search. A 55-foot drilling mast is poised over circular 10-foot-wide opening from deck through bottom.

"Live" TV show 40 fathoms down guides our search for future oil reserves

With new oil becoming harder to find, our search widens. Now we're exploring the ocean floor — and new techniques are the rule. In one such venture we lowered a TV camera 250 feet below the waves to help guide the drilling of test holes from shipboard.

This is typical of the novel techniques used in our quest that last year took us to 21 states, Canada, Alaska and ten Latin American and Caribbean countries. In all, we drilled 120 exploratory wells. Although the cost ran to many millions, the successful ones helped us locate more new oil than we withdrew from the ground.

Actually, this benefits you as well as Standard. It means an adequate reserve of our most valuable national resource, to be drawn on in days ahead to provide the thousands of products from petroleum so essential for your daily needs.



Progress in petroleum means

Finding oil to meet U.S. consumption that will increase 55% in 10 years — from 9 million barrels per day now to 14 million by 1968.

STANDARD OIL COMPANY OF CALIFORNIA *plans ahead to serve you better*

TABLE 1—SAMPLE DATA FOR MAXIMUM DOWNHOLE HYDRAULIC POWER IN A 12¼-IN. SOUTH LOUISIANA TYPE HOLE

The maximum economic mud pressure is assumed to be 3,000 psi.

Depth/ft.	Assumed maximum mud pressure (psi.)	Flow rate for maximum downhole horsepower (g.p.m.)	Total surface hydraulic horsepower	P bit psi.	Downhole hydraulic horsepower	Required nozzle area (in. sq.)	Closest nozzle sizes (in.)
4,000	3,000	915	1,600	1,960	1,042	.611	2 5/8 3 1/2
8,000	3,000	695	1,200	1,960	795	.465	2 17/32 3 7/16
12,000	3,000	580	1,010	1,960	662	.388	2 1/2 3 13/32

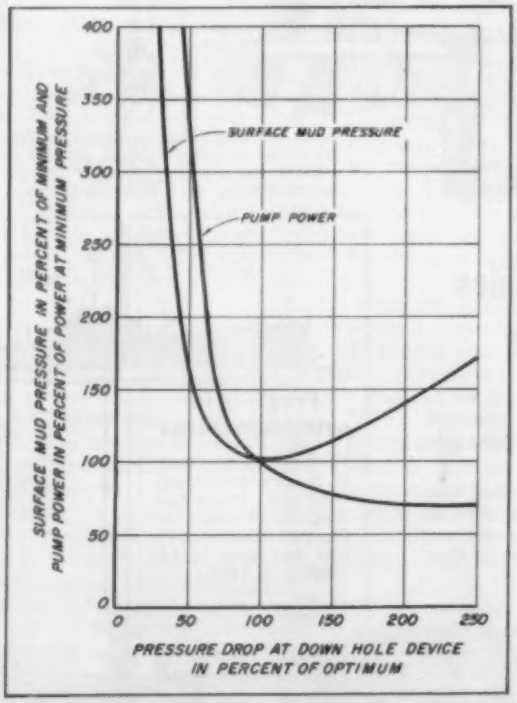
TABLE 2—SAMPLE DATA FOR MAXIMUM DOWNHOLE HYDRAULIC POWER IN A 12¼-IN. SOUTH LOUISIANA TYPE HOLE

The maximum economic mud pressure is assumed to be 5,000 psi.

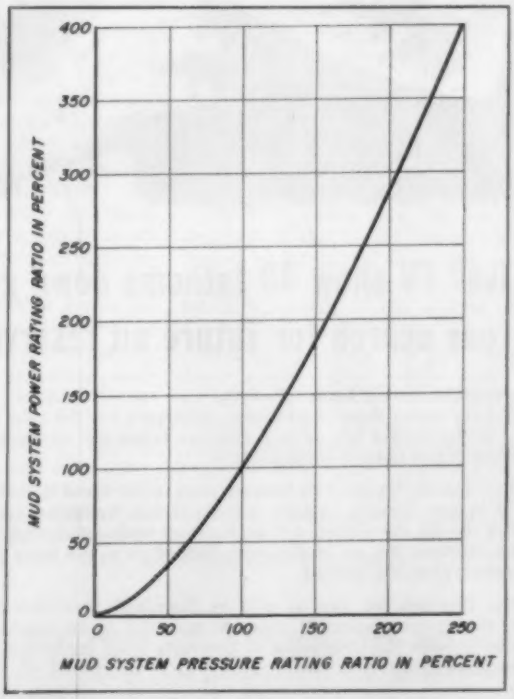
Depth/ft.	Assumed maximum mud pressure (psi.)	Flow rate for maximum downhole horsepower (g.p.m.)	Total surface hydraulic horsepower	P bit psi.	Downhole hydraulic horsepower	Required nozzle area (in. sq.)	Closest nozzle sizes (in.)
4,000	5,000	1,200	3,500	3,275	2,290	.621	2 5/8 3 1/2
8,000	5,000	910	2,650	3,275	1,735	.471	2 17/32 3 7/16
12,000	5,000	760	2,210	3,275	1,450	.394	2 1/2 3 13/32

significant that these values, calculated for maximum downhole hydraulic power, are very close to those actually used in the most advanced current jet-drilling practice. This indicates that the most advanced current jet-drilling practice is very close to the ideal. The downhole hydraulic power is nearly the highest possible with the pipe sizes, mud weights, and surface mud pressures now considered economic. No significant increases can be made in hydraulic power or impact at the bottom of the hole without using larger-bore drill strings, lighter muds, or higher surface mud pressures.

Devices other than jet bits can use the hydraulic power at the bottom of the drill string. There are reciprocating motors, turbines, positive-displacement rotating motors, and other devices. As far as possible, these devices should be arranged to conform to the conditions for maximum downhole power. Deviations from these conditions, particularly in reduced pressure



SURFACE AND PRESSURE and pump power needed to operate downhole devices of the same power, using the same drill string and mud weight, but with different pressure drops.



VARIATION of mud-system power rating with pressure rating for most downhole hydraulic power, showing how pump power changes as the pressure rating changes.

NO COMPROMISE WITH QUALITY

in Flexitallic Spiral-Wound Gaskets

There are shorter ways — quicker ways — to make gaskets, but there's only one Flexitallic way.

Each Flexitallic Spiral-Wound Gasket is made to meet a specific sealing requirement. The flange design and the bolt load determine the density of the gasket — compression response is directly related to service. And then, with the most exacting mechanical controls, each Flexitallic Gasket conforms to specification.

Result: the right gasket for the right flange, to make the proper seal.

In the severest service — thermal and physical shock, corrosion, vibration, and unpredictable joint stresses — the Flexitallic Spiral-Wound construction compresses like a spring and then rebounds when the bolt load is relaxed.

For genuine Flexitallic Gaskets, look for Flexitallic Blue—the blue dye in the Canadian asbestos filler. It identifies the Spiral-Wound construction pioneered by Flexitallic in 1912.

FLEXITALLIC GASKET CO.
8th & Bailey Sts. Camden 2, N. J.

Flexitallic®
SPIRAL-WOUND GASKETS

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Flexitallic is a registered tradename. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue* — it's our exclusive blue-dyed Canadian asbestos filler.

drop, change the surface mud pressure and pump power required.

Low-pressure-drop devices . . . The conditions necessary to get the lowest possible surface mud pressure with any given downhole power are identical to those derived in the appendix for maximum downhole power. This means that a pressure drop across the device on the bottom of the drill string of about two-thirds of the surface mud pressure will produce the lowest possible surface mud pressure with the downhole power realized.

As an example, take the surface pressure and pump power needed when using an optimum device to the surface pressure. Compare this to pump power needed when using a device with one-half the pressure drop and twice the flow rate of the optimum device. A device with one-half the optimum pressure drop requires a surface mud pressure about 160% of that needed for an optimum device. The pump power is 320% of the pump power needed for an optimum device.

Therefore, a mud-operated downhole device should be designed for a pressure drop and a mud-flow rate as close as possible to the optimum.

Future pump requirements . . . Higher-powered jets may be used in future jet drilling. This will increase the pressure and power ratings required of future mud systems. The pressure and power ratings needed can be anticipated from the relation of pump power to surface mud pressure for optimum flow rates. This relation is:

$$HHP \approx \frac{(P_{limit})^{1.53}}{K_2\,(2.9\,K_1)^{0.53}} \qquad (2)$$

where

HHP = hydraulic horsepower of pump

P_{limit} = maximum economic mud pressure, psi.

K_1 = a function of hole and pipe dimensions, and mud weight

K_2 = a constant relating pressure and flow rate to hydraulic horsepower

Derivation of this expression is in the appendix.

This equation indicates that under these conditions the power rating of a mud system should vary as the 1.53 power of the pressure rating.

Consider the effect if the mud pressure is increased to 5,000 psi. in a system now using 3,000 psi. This is an increase in pressure rating to 167%. The corresponding pump power increase is to about 220%.

Table 2 shows the effects of this increase in pressure on the drilling of a hole similar to that used for Table 1. This indicates that where a total of about 1,600 hydraulic horsepower is needed today with a mud pressure of 3,000 psi., about 3,500 hydraulic horsepower will be needed when improvements allow the mud pressure to be raised to 5,000 psi.

If downhole mud motors are developed with a pressure drop and a flow rate near the optimum, the pumps required will be similar to those for jet drilling with the same downhole power.

If downhole mud motors with less than the optimum pressure drop are used in the future, the pump power required will be higher for a given

"...a pressure drop across the device on the bottom of the drill string of about two-thirds of the surface mud pressure will produce the lowest possible surface mud pressure with the downhole power realized."

Washette by Cook
AMERICA'S LEADING OPEN-END WASHER

OPERATING COSTS GO DOWN!

On the job laundry saves time — increases useage efficiency.

Washette BY COOK *is ideal for . . .*

- Factories
- Industrial Plants
- Offshore drilling rigs
- Construction Camps
- Tankers, Barges
- Field Camps
- Anywhere laundry must be done efficiently, economically.

Washette is completely flexible, fits varied and complex laundry conditions, easy to use, simplified controls. If you have a special laundry problem, write us—NO OBLIGATION.

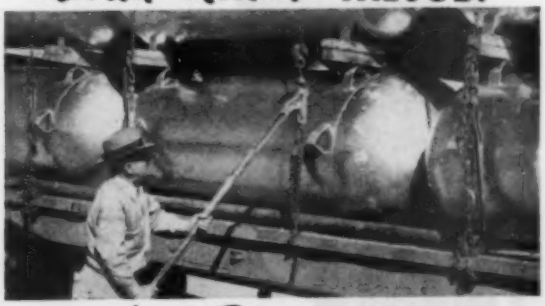
AVAILABLE IN AC-DC

Write for FREE brochure

48-Hour Shipment on all Standard Models

Cook Machinery Co., Inc.
4301 S. Fitzhugh Ave. Dallas 10, Texas

Load-Rated* DOES THE JOB!



LEBUS Load-Rated LOAD BINDERS ARE GUARANTEED NOT TO BREAK!

It's a fact! If a *100% drop forged* Lebus Load Binder breaks in *normal use* we'll replace it. Strength . . . safety of this heat treated binder has been proved in tough drilling and logging industries. Once locked down, the Lebus handle can't snap up, even under shifting loads—won't open until released. Shifted loads can't freeze the binder either. Examine this 100% drop forged heat treated binder at mill supply, industrial or construction equipment distributors—or write:

*Trademark

CROSBY-LAUGHLIN Division
AMERICAN HOIST & DERRICK COMPANY
FT. WAYNE 1, INDIANA

HERE'S PACKAGED PROOF!

OF THE GROUND BELOW THE RIG

There's no need for second guessing about productive strata when the evidence is right before your eyes. The new rubber sleeve core barrel delivers cores in a complete package even in soft, unconsolidated formations.

Formerly, soft formation cores were unobtainable due to grinding and drilling fluid wash. Now the rubber sleeve wraps them tightly, keeps them intact, and offers maximum protection against washing, blocking or friction grinding. Cores are delivered, "packaged as cut," ideal for analysis, handling and shipping.

Every dollar you invest in a well is spent for the sole purpose of discovering oil. For minimum risk in exploration, you must evaluate the formation below the rig. The only sure method of formation evaluation is coring. The development of the Rubber Sleeve Core Barrel has greatly expanded the area in which you can obtain the vital information you need to determine a productive field. With the addition of the soft formation rubber sleeve core barrel to a complete line of conventional and wireline barrels, Christensen has a core barrel to fit your needs, regardless of the formation type.

Call the Christensen representative nearest you and get the "Hole" story.

For more detailed information on the rubber sleeve core barrel, ask for RS-801. For additional information on conventional or wireline core barrels, ask for CB-608.
Write or call
Christensen Diamond Products

Diamonds Mean, "Less cost per foot."

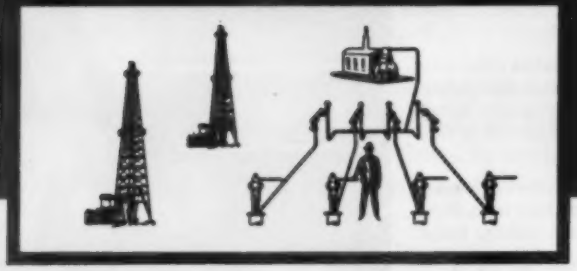
CHRISTENSEN DIAMOND PRODUCTS

1937 SOUTH SECOND WEST • SALT LAKE CITY, UTAH

W A T C H

SARGENT

PUMP PERFORMANCE



UNDER THE TOUGHEST FIELD CONDITIONS

For 38 years Sargent has successfully worked in research, development and manufacture of oilwell, aircraft, marine, missile, and electronic equipment. The vast knowledge and experience gained through successfully engineering and manufacturing products in these highly advanced fields has been incorporated into building the finest pumps in the oilfields. Sargent builds every API classified pump obtainable with metals to fit any and all well conditions.

In 1924 the first Sargent hydraulic pump patent was obtained (patent #1,503,602).

Through years of research, re-design and refinement, Sargent now manufactures the pump proven to be the most efficient rodless, long stroking, bottom hole hydraulic unit obtainable, which actuates the time-proven bottom hole pump. Sargent provides the most complete service in the industry by company trained experts through company operated field stores.

The outstanding features of the Sargent rodless, long stroking, free or conventional design hydraulic pump are: • More volume • Wide selection of proven metals and design • Higher efficiency in gassy wells • Simple, yet rugged construction • Service in the fields (at the point of operation).

That's why you can "Watch Sargent" pump performance anywhere in the world under the toughest field conditions and learn for yourself that results prove "Sargent Builds 'em Better"!

"GOOD WILL" is the disposition of the pleased customer to return to the place where he has been well treated.
– U.S. Supreme Court

Standard of Excellence *Since 1920*

SALES AND SERVICE

CALIFORNIA	OKLAHOMA	TEXAS	ILLINOIS
Long Beach	Oklahoma City*	Odessa	Grayville
Bakersfield	Ratliff City	Snyder	ARKANSAS
Santa Maria	Pawhuska	Andrews	Magnolia
Ventura	Seminole	Houston*	KANSAS
Taft	NEW MEXICO	Midland*	Chase
Huntington Park	Farmington	Sundown	Russell
Santa Fe Springs	Hobbs	Wichita Falls	Great Bend*
	COLORADO	Quitman	
	Rangely		

* Sales Representation

Sargent — QUALITY BUILDS GOOD WILL

ENGINEERING CORPORATION

MAIN OFFICE & PLANT, 2533 E. FIFTY-SIXTH ST.
HUNTINGTON PARK, CALIF.

downhole power. The amount of the increase in pump power will depend on the deviation of the pressure drop from the optimum pressure drop.

Reference

1. "The Relation of Nozzle Fluid Velocity to Rate of Penetration of Drag-Type Rotary Bits," by J. P. Nolley, G. E. Cannon, and Douglas Ragland. API Drilling and Production Practices, 1948.

APPENDIX

The following symbols are used in the derivations:

P = mud pressure, psi.
Q = mud flow rate, g.p.m.
HHP = pump hydraulic horsepower
BHP = downhole hydraulic horsepower
K_1 = a function of hole and pipe dimensions, and mud weight relating flow rate to pressure drop
n = an exponent relating flow rate to pressure drop
K_2 = a constant relating hydraulic horsepower to flow rate and pressure.

Here is a derivation of the expression for the mud-flow rate which gives maximum down-hole hydraulic power:

$P_{surface} = \Delta P_{drill\ string\ and\ hole} + \Delta P_{bit}$

$P_{drill\ string\ and\ hole}$ can be approximated by:

$$\Delta P_{drill\ string\ and\ hole} = K_1 Q^n$$

Substituting and multiplying through by Q/K_2:

$$\frac{Q P_{surface}}{K_2} = \frac{K_1 Q^{n+1}}{K_2} + \frac{Q \Delta P_{bit}}{K_2}$$

By definition:

$$BHP = \frac{Q \Delta P_{bit}}{K_2}$$

Substituting and rearranging:

$$BHP = \frac{Q P_{surface}}{K_2} - \frac{K_1 Q^{n+1}}{K_2}$$

Differentiating:

$$\frac{d\ (BHP)}{d(Q)} = \frac{Q\ d(P_{surface})}{K_2\ d(Q)} + \frac{P_{surface}}{K_2} - \frac{K_1 (n+1) Q^n}{K_2}$$

For maximum BHP:

$$\frac{d(BHP)}{d(Q)} = 0 \qquad Q = Q_{opt}$$

When using the maximum economic $P_{surface}$:

$$P_{surface} = P_{limit} \qquad \frac{d P_{surface}}{dQ} = 0$$

Substituting and rearranging:

$$Q_{opt} = \left[\frac{P_{limit}}{K_1 (n+1)} \right]^{1/n} \qquad (1)$$

Following is a derivation of the expression for the pressure drop across the down-hole device which gives the highest hydraulic power at the bottom of the drill string:

$$P_{limit} - \Delta P_{bit} = K_1 Q_{opt}^n$$

Substituting for K_1 in Equation 1 and rearranging:

$$\Delta P_{bit} = P_{limit} - \frac{n}{n+1} \qquad (2)$$

Following is a derivation of the expression for the relation between the pump hydraulic power and the surface pressure:

Multiplying Equation 1 by P_{limit}/K_2:

$$\frac{P_{limit}\ Q_{opt}}{K_2} = \frac{(P_{limit})^{(n+1)/n}}{K_2 [K_1 (n+1)]^{1/n}}$$

By definition:

$$HHP = \frac{P_{limit}\ Q_{opt}}{K_2}$$

Substituting:

$$HHP = \frac{(P_{limit})^{(n+1)/n}}{K_2 [K_1 (n+1)]^{1/n}} \qquad (3)$$

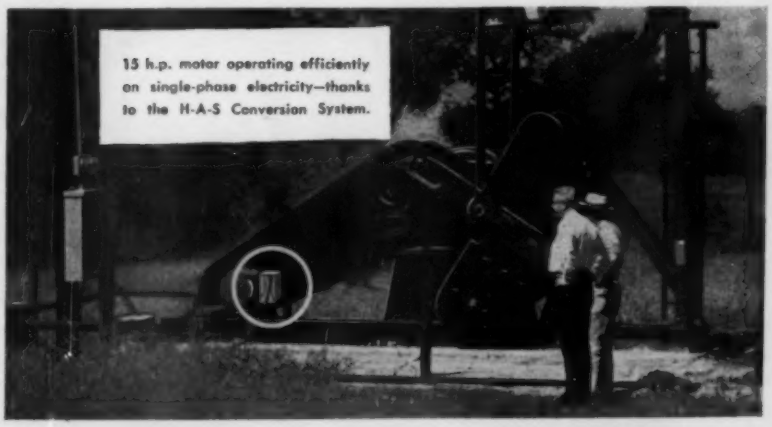
From calculation of the mud pressure for a number of cases, it appears that with any given hole situation the surface mud pressure varies approximately as the 1.9 power of the mud-flow rate. Therefore n = 1.9.

Substituting n = 1.9 into Equations 1, 2, and 3:

$$Q_{opt} \approx (P_{limit}/2.9K_1)^{0.52} \qquad (1a)$$

$$P_{bit} \approx 0.66\ P_{limit} \qquad (2a)$$

$$HHP \approx \frac{(P_{limit})^{1.68}}{K_2 (2.9\ K_1)^{0.53}} \qquad (3a)$$



Write for this NOW!

"How to use three-phase motors on SINGLE-PHASE CURRENT"

. . . and profit from the added economy and efficiency!

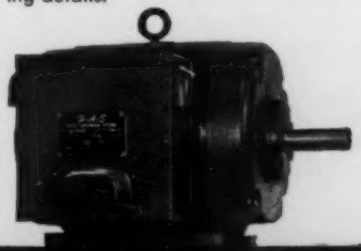
Three-phase motors cost less than single-phase motors, are more efficient and have far greater salvage value.

The New H-A-S Phase Conversion System enables you to use three-phase motors (3 h.p. or larger) on 220 V single-phase current. Three-phase motors cost less, operate for less, and can be used later on three-phase current.

The H-A-S is available in two models, for motor mounting and remote mounting.

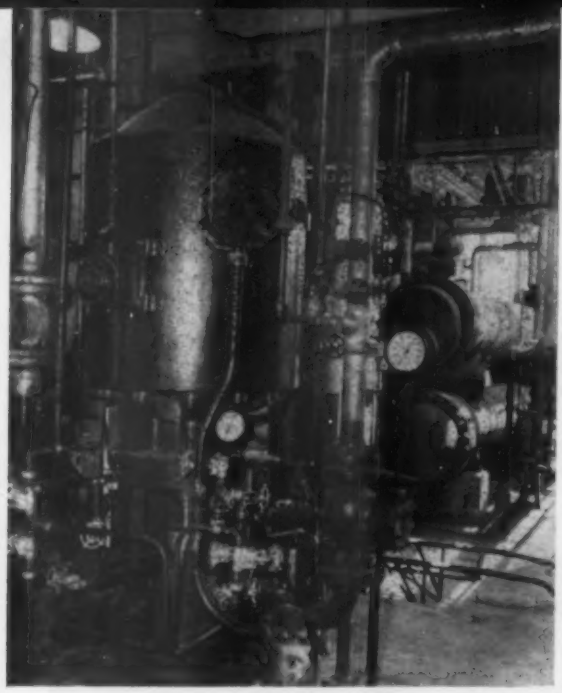
On many rural single-phase lines service is limited to 5 h.p. single-phase motors, but the H-A-S Phase Conversion System permits the use of three-phase motors up to 75 h.p.

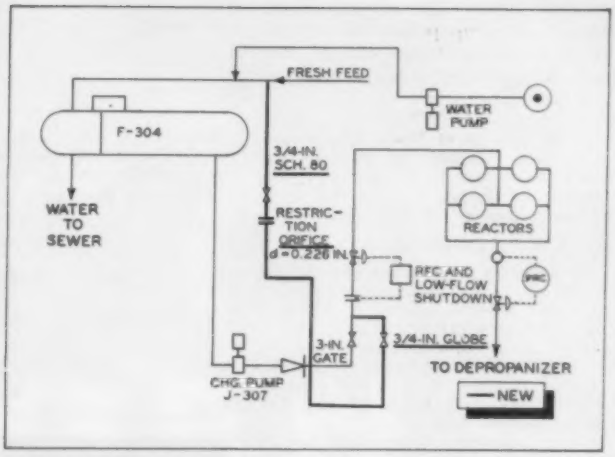
This is GOOD NEWS in the oil country. To solve an immediate problem—or for your files—write NOW for the interesting details!



KEN ELLIOTT MOTORS, Inc.
P. O. Box 5158
BOSSIER CITY, LOUISIANA

H-A-S PHASE CONVERSION SYSTEM





STARTUP FACILITIES for the cat poly charge pump at Pure's Nederland refinery. Photograph of unit is at left.

BY LARRY RESEN
Refining Editor

How pump-startup problem was solved

INSTALLATION of a bypass and utilization of an existing water-wash system eliminated a troublesome start-up program on a pump in light-hydrocarbon service.

The pump is used to charge feed stock to the polymerization unit at the Pure Oil Co.'s Nederland, Tex., refinery.

Handling of this propane-propylene charge stock takes place at near-equilibrium conditions. Thus, a slight change can easily shift the equilibrium and cause vaporization within the system, with its attendant problems.

Under previous conditions, the fresh feed entered a combination water-wash settler and accumulator, from which the charge pump took suction. This is a multistage centrifugal pump, vertically mounted. A 3-in. gate valve was located downstream of this pump and beyond this was a recorder flow controller equipped with a low-flow shutdown device. The charge then passed through reactors and out through a pressure recorder-controller which holds the back pressure on the entire system.

At normal flow rates the pump operated satisfactorily with a discharge pressure in excess of 1,200 psig. Sufficient suction head was available to maintain the proper flow to pressure relationship up to a flow rate of about twice the rated pump capacity. Above this rate vaporization took place in the pump causing momentary loss of flow and causing the low-flow shutdown device to shut the pump down.

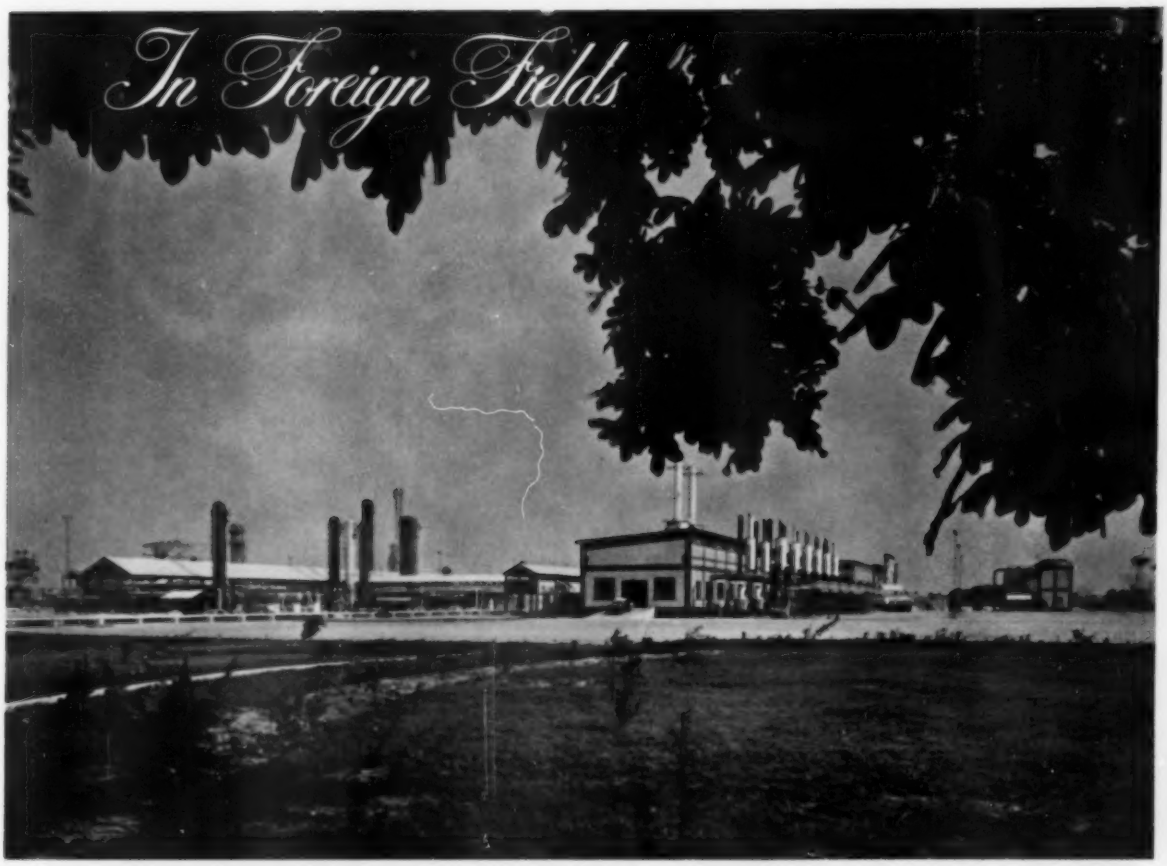
During startup the low-flow shutdown device was deactivated. The 3-in. gate valve was used to hand control the flow at a rate which would not exceed the capacity of the suction system. However, opening the 3-in. valve the slightest amount resulted in a momentary high flow rate which produced high friction losses and a reduction of the NPSH. Vaporization then occurred in the impeller followed by sticking of the pump. It was quite difficult to start the pump with this arrangement.

The solution . . . A twofold approach was used. A bypass was installed around the 3-in. gate valve which included a ¾-in. globe valve. A circulating system was also installed including a ¾-in. line equipped with a restriction orifice.

The circulating system was designed to permit a 40-g.p.m. flow rate for pump protection during startup. Under startup conditions, the recirculation line is the only one open. At the circulation rate noted and with no forward flow, the hydrocarbon temperature rise across the pump is about 31°. Significantly, the water-wash facilities inherent in the polymerization process flow are utilized and the hydrocarbons are recirculated through the water-wash accumulator. By dissipating the heat of pumping in this manner, the system temperature will only rise a little over 11½° in an hour. One hour is adequate for putting the pump on line.

The bypass line is slowly opened around the pump-discharge block valve to gradually pressure the reactors until the back-pressure recorder-controller comes into operation at 1,000 psig. This bypass has been designed to permit a flow rate of 80 g.p.m. with a pressure drop of about 80 psi. with the globe valve wide open. This bypass is small enough to permit the operator to start flow without losing suction due to a high flow surge. It is large enough, meanwhile, so that, when wide open, sufficient flow is permitted to put the FRC in control without danger of sticking the pump. Once a flow rate of 2,000 bbl. per day is reached and with the FRC in control, the 3-in. gate valve on the pump discharge is then opened completely. The recirculation and bypass lines are closed, the low-flow shutdown device is placed in service, and the flow rate is brought up to normal.

These minor changes have completely eliminated the previous difficulties.



PETROLEOS MEXICANOS

Gas Processing Plant

CIUDAD PEMEX, MEXICO

HUDSON services in foreign fields are flexible to the owners' requirements, including design and building of the entire project, or process design, mechanical design, purchasing or construction. Illustrative is the above pictured major gas processing project in Mexico, designed to extract 30,000 barrels of liquid products from 500 million cubic feet per day of gas. Process design, mechanical design, and procurement of equipment was entrusted to HUDSON. The plant was constructed by Petroleos Mexicanos near the Yucatan Peninsula in Mexico.

In Mexico, Canada, South America, Europe, and the Near East; in deserts, mountains, and jungles; in locales in some cases without established rail, road, or water transportation; working at times with inexperienced labor forces of mixed nationalities; under climatic extremes, HUDSON has completed major oil, gas, chemical, and heavy mineral processing projects – on time – and to the complete satisfaction of the owners.

This varied experience from Tierra del Fuego to Canada, from Pakistan to Peru, qualifies HUDSON to complete with speed and facility major processing projects under the most difficult conditions in any part of the world.

DESIGNERS AND CONSTRUCTORS OF PROCESS PLANTS FOR THE OIL, GAS, CHEMICAL, AND MINING INDUSTRIES

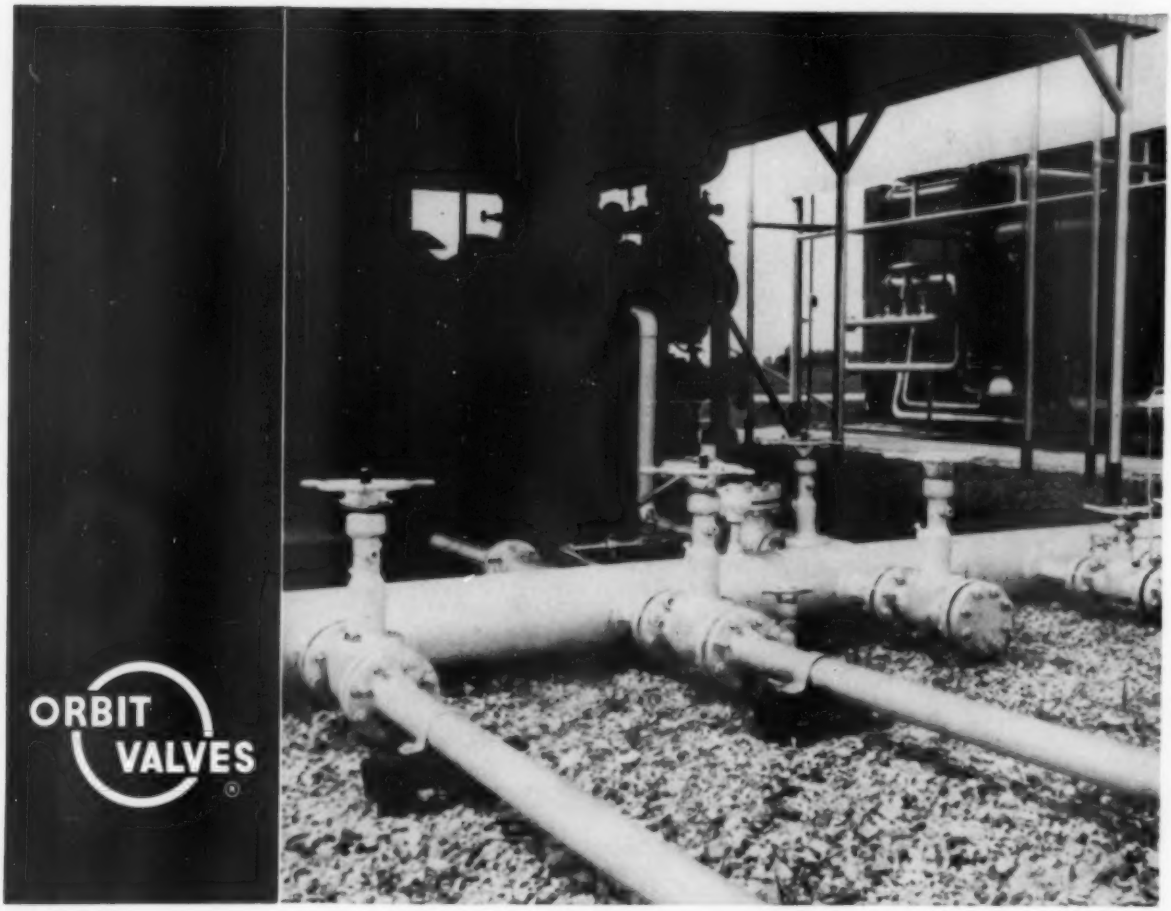
HUDSON

ENGINEERING CORPORATION

FAIRVIEW STATION • HOUSTON, TEXAS

SALES OFFICES: 9935 Santa Monica Blvd. Beverly Hills, California | 122 East 42nd St. New York 17, N. Y. | 199 Bay Street Toronto, Ontario, Canada | 17 Stratton St., Picadilly London W. 1, England | Corrientes 1115 Buenos Aires, Argen. | Rua Mexico 45 Rio de Janeiro, Brazil

QUALITY AND RELIABILITY AT WORK



ORBIT FORGED STEEL VALVES ARE NON-LUBRICATED

and built for continuous heavy-duty service

Orbit valves shown in picture at top are installed in compressor discharge service. This is a tough service where velocities and vibration would play havoc with most valves — but not with Orbit valves, because they are built to withstand continuous heavy-duty service.

WRITE FOR CATALOG 58-B COVERING ASA CLASS VALVES OR CATALOG 58-A COVERING PRODUCTION VALVES.

ORBIT VALVE COMPANY

P. O. BOX 699, TULSA, OKLAHOMA, Phone LUther 4-4761, TWX TU 925
WAREHOUSES: HOUSTON, TEXAS, 407 Velasco, CApitol 8-6623, TWX HO 115; ODESSA, TEXAS, 402 West County Road, FEderal 7-2263, TWX ODESSA TEX 8706; LAFAYETTE, LOUISIANA, 3111 Cameron St., CEnter 4-3326; CASPER, WYOMING, 414 South Elm Street, Phone 2-1324; EDMONTON, ALBERTA, CANADA, 7119-104th St., Phone 391-283. WEST COAST REPRESENTATIVES: Charles Lowe Company, 383 Fourth Street, San Francisco, Calif.; Marshall E. Niedecker Company, 2785 Cherry Ave., Signal Hill, Calif. CANADIAN REPRESENTATIVES: T. R. Pickford & Company, Ltd., Calgary, Alberta, 309 7th Avenue West; Amherst 2-7371. EXPORT REPRESENTATIVE: New York 36, N. Y., 500 Fifth Avenue, BRyant 9-2236.

BY W. L. NELSON
Technical Editor and
Petroleum Consultant

Questions on
TECHNOLOGY

Effect of wax on value of crude oil

What are the effects of paraffin wax on the value of crude oil and can you suggest a method of comparison between two crude oils of the same gravity, but one is waxy whereas the other is not? F.E.P.

The presence of wax in a crude oil has three general effects on the value of the crude oil:

1. Detrimental, because it usually or may mean high pour points for diesel and distillate fuel oils, high freezing point jet fuels or kerosines, low-octane-number cracked gasolines, and possibly low-octane-number straightrun and reformed gasolines.

2. Advantageous, because of slightly larger yields of cracked gasoline.

3. Possibly greatly advantageous if very large amounts of wax are present provided a market is available for large amounts of wax.

In addition, wax is usually obtained as a byproduct in the manufacture of high-quality lubricating oils, and in such a situation, the amount of wax in the crude oil is usually relatively small.

The really waxy oils of the world seldom contain good lubricating oils. Thus, Venezuelan Anaco wax crude blends (43.7° API) contain paraffin (or wax) distillate that have about 46 wt. % wax in them, but the dewaxed lubricating oil (11.65 characterization factor) may have a viscosity index of only 30-40 (see Petroleum Refinery Engineering, fourth edition, p. 83, McGraw-Hill Book Co., Inc., New York, 1958).

In contrast, a Pennsylvanian oil (Duke Center Pipeline, 43.6° API) will usually contain less than 20% wax but the lube is excellent. Only occasionally does an oil contain both excellent lubes and large amounts of wax, as in the case of Bahia, Brazil, 39.6° API oil which contains 12.7 characterization factor raw paraffin distillate and lubes equaling those of Pennsylvania.

In general, the amount of wax is indicated by the difference in the characterization factors of the materials that boil at 550° and at 750° F. in the crude oil (see Questions on Technology, The Oil and Gas Journal, December 16, 1957, p. 131). A large difference (0.5 to 1.0 unit) means large amounts of wax (40-60%) in the paraffin distillate (and probably also in the total or long residuum), whereas a difference of 0.15 to 0.3 units represent more normal crude oils. Parentis (French) crude oil shows a difference in characterization factor of only about 0.15.

In summary, wax is ordinarily a byproduct of lubricating-oil manufacture, and thus the value of the crude oil is dependent on the quality and yields of lubricating oils contained in it. At the other extreme, certain crude oils contain very large amounts of valuable wax, but only occasionally can a special price be obtained for these crude oils because the market for wax is usually only large enough to absorb the byproduct wax produced along with lubricating oils. Finally, the presence of wax usually changes the value of ordinary crude oils by only a small or negligible amount. It restricts the yields of diesel fuel, results in lower octane number cracked gasolines, but slightly increases the yield of cracked gasoline.

Lube-oil crudes available to world markets

What lubricating oil crude oils are available to the world market? V.C.

Strange as it may be, the demand for lubricating oils is so small and so evenly dispersed throughout the world that many excellent crude oils lie in the ground at the wrong place awaiting development, and many less suitable oils at the right place are being used for lubricating-oil manufacture. Thus, no very clear picture of which oils are truly lubricating-oil crudes is possible.

However, among the most suitable oils known to this department are:

API gravity	
42-44	Pennsylvania
43	Rodessa, La. (some sulfur)
40	Bahia, Brazil
52	Pegasus, Texas (sour, low sulfur)
41	Los Mangos, Venezuela
41	Williston basin (Devonian)

The following are also very good for lubricating oil manufacture:

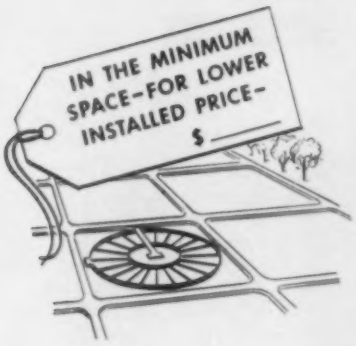
API gravity	
24	Talco, Texas (high sulfur)
36	Sibucara, Venezuela (high sulfur)
37	Oklahoma City, Okla.
40	Panhandle, Texas (sour)
41	Cerro Manatiales, Chile
42	West Tarra, Venezuela
44	Atlanta, Arkansas (sour and high sulfur)
46	Barnhart, Texas
48	Cumarebo, Venezuela
50	Coldwater, Michigan (high sulfur)
50	Caico Seco, Venezuela
31	Lago Mar., Venezuela (high sulfur)
38	Tacata, Venezuela
42	Apamate, Venezuela
55-62	Bolivian (small yield)

After these are many oils of high characterization factor that yield large amounts of lubricating oils by solvent extraction, such as:

API gravity	
33	Saban, Venezuela (high sulfur)
34	Las Mercedes, Venezuela (high sulfur)
37	Ranger, Texas
37	Mexia, Texas
38	Abqaiq, Saudi Arabia (high sulfur)
38	Camrose, Canada
38	Buckeye Pipeline, Ohio (high sulfur)
41	Cranfield, Mississippi
41	West Edmond, Oklahoma

Finally, there are literally hundreds of suitable crude oils (using solvent refining) including many oils that are recognized as lubricating-oil crudes, such as East Texas; Burbank, Okla.; Mid-Continent crudes, etc.

Note that each of the crude oils is labeled if it is sour or if it contains more sulfur than an average crude oil of the same gravity.



You get dependable performance for all types of brine and water treatment with INFILCO equipment

INFILCO

INFILCO
INCORPORATED
General Offices · Tucson, Arizona · P.O. Box 5033
Field offices throughout the United States
and in foreign countries

57402

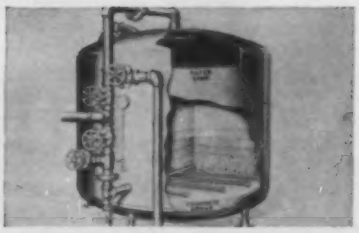
ACCELATOR®
plants for clarification, softening and stabilization
Effective mixing of chemicals and raw water with recirculating slurry and downflow separation effect better treatment in minimum area — and at low cost. For water, brine or waste treatment.
BULLETIN 1825

CHEMICAL FEEDERS
Accurately controlled feed rates and maximum economy
Compact designs for automatic or manual control, for all types of chemicals. Type E Feeders dispense dry chemicals volumetrically, from bulk storage to dry or wet applications. BULLETIN 215

NEUSOL® FEEDERS
Wide feed range, corrosion resistant construction adapt this versatile and dependable displacement feeder to most chemical solution requirements.
BULLETIN 340

AERATORS and DEGASIFIERS
For all types of gas-liquid transfer applications. Efficient oxidation, carbon dioxide and hydrogen sulfide removal.
BULLETIN 106

Request information on recarbonators, deaerating heaters and vacuum degasifiers.



PRESSURE FILTERS
Standard or special construction for the most exacting process requirements
Vertical or horizontal, sand or anthracite types with manual or automatic controls for water or brine filtration. BULLETIN 1520

The STELLAR® diatomite filter, with its exclusive "gas-bump" cleaning is standard for amine solutions in most of the largest gas companies. BULLETIN 1560

MODERN INSTRUMENTATION
Maintains efficiency, reduces operating cost of treatment
Design and assembly of pneumatic, electric or hydraulic control components for manual or automatic, constant or variable rate plants. Operating consoles and control panels specifically engineered for complete treating plants. BULLETIN 1100

INFILCO CAN help you solve any water and brine treatment problem in oil production and refining

From experience, extending over 60 years, INFILCO can give you the best results with lowest *first* cost and *operating* costs.

No other line of equipment is so complete—none so advanced in method and design. Above are a few examples.

It will pay you to investigate. Inquiries are invited on all matters relating to water or brine treatment. Write today for new condensed catalog, Bulletin 80, for a more complete description of INFILCO products.

THE ONLY COMPANY impartially offering equipment for ALL types of water and waste processing—coagulation, precipitation, sedimentation, flotation, filtration, ion exchange and biological treatment.

Atmospheric rerunning and steam distillations

BY W. L. NELSON
Technical Editor and
Petroleum Consultant

TABLE 2—APPROXIMATE 1956 COSTS OF DISTILLATION PLANTS, DOLLARS PER DAILY BARREL*

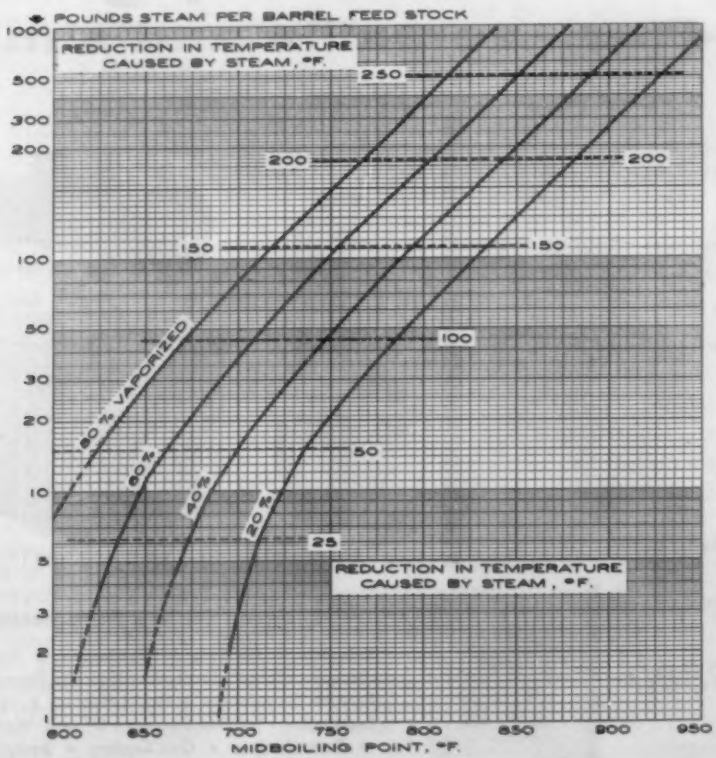
Cracked gasoline rerun	$39 (10,000) — $127 (1,000)
Crude oil stabilization (in field)	$59 (500) — $117 (100)
Debutanization†	$39 (10,000) — $92 (1,000)
Lube oil (solution or solvent rerun)	$105 (5,000) — $189 (1,000)
Lube oil (pressed distillate or neutral rerun)	$98 (5,000) — $200 (1,000)
Hydrocarbon or solvent fractionation‡	
2RR—20 plates	$39 (10,000) — $94 (1,000)
4RR—25 plates	$57 (10,000) — $123 (1,000)
8RR—33 plates	$92 (10,000) — $162 (1,000)
16RR—43 plates	$170 (10,000) — $244 (1,000)
Vacuum flash	$57 (30,000) — $98 (1,000)
Vacuum distillation (lubes)	$145 (10,000) — $325 (600)

*Capacities are indicated in parenthesis. †Cost as a separate installation. ‡Questions on Technology, The Oil and Gas Journal, June 9, 1958, p. 133.

TABLE 1—MISCELLANEOUS OPERATING COST ELEMENTS FOR RERUNNING OR STEAM DISTILLATIONS

	Unit (somewhat standard)		1956 unit cost
	Independent	Majors	
Supervisory labor*	0.1-0.25 men/8-hr. shift*	0.5-0.8*	$3.85/hr.†
Operating labor*	0.9-1.75 men/8-hr. shift*	3.5-5.0	$3.12/hr.†
Maintenance	3-4%/yr. of replacement‡		(Table 2)
Obsolescence, ins., taxes and interest—7%/yr. of replacement			(Table 2)
Laboratory control*	0.1-0.3 men/8-hr. shift*	0.2-0.7*	$3.12/hr.†

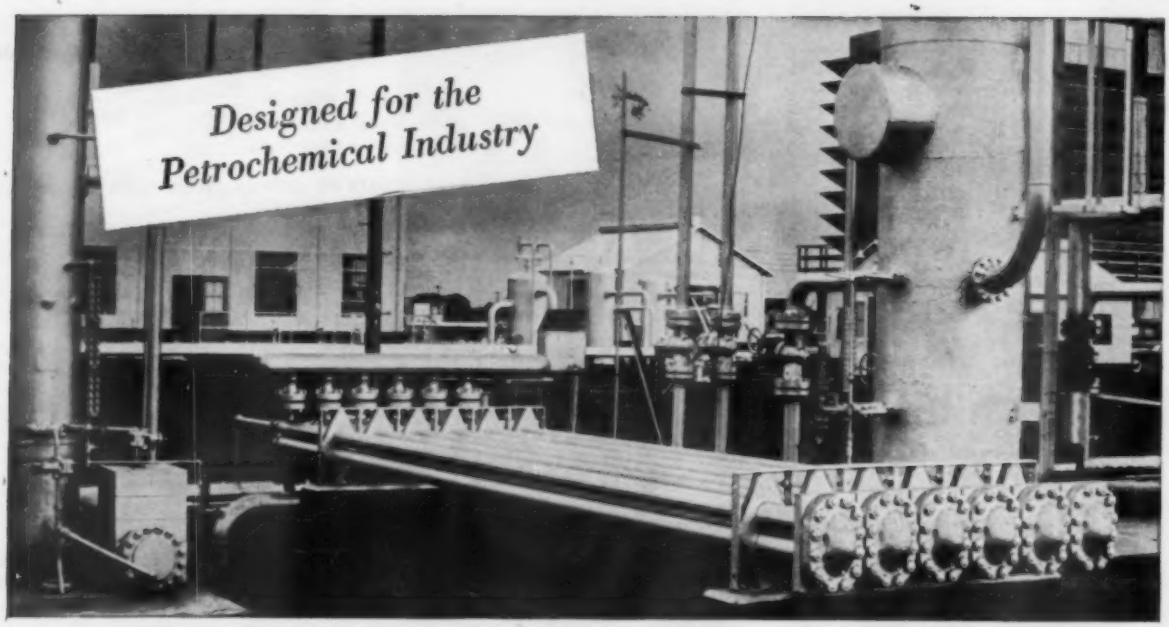
*If operation is not routine the supervisory labor and laboratory control may be triple the amounts shown, and the operating labor may also be larger. At the other extreme, some operations are not conducted separately and these may require little labor. †Average U. S. refinery wages including 27% for all burdens. ‡Occasionally 5% if corrosive solvents or materials are encountered.

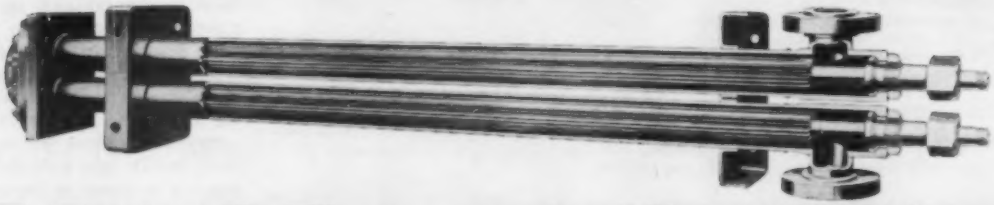


EFFECT OF STEAM on the vaporizer temperature of narrow-boiling-range materials. (Process Costimating No. 31 showed a similar chart for wide-boiling-range materials.)

SO MANY FACTORS are involved in plant operation that only the grossest suggestions can be made regarding operating costs. Among these factors are distillation of slop gasolines, solvents from lubricating oils, pressed distillate, cylinder or bright-stock solutions, and others. It is obvious that generalities about the fuel, water, power, or steam requirements cannot be made. However, the amount of labor and maintenance is about as shown in Table 1. The installed costs of a few rerunning types of plants are indicated in Table 2 along with topping and vacuum plants for comparison (see also the construction costs in Costimating Numbers 26-30, OGJ, March 11, April 1 and 15, and May 6 and 13, 1957).

The bottom product is often stripped with steam (0.2-0.6 lb. per gal.) and if side-draw products are produced the amount of stripping steam is 0.2 to 0.45 lb. per gal. If steam is also used to reduce the partial pressure, so-called steam distillation, the amount needed for wide-boiling-range stocks (slopes of 8° to 13° F. per per cent) such as crude oils is indicated in Process Costimating No. 31, Process Steam for Atmospheric Distillation, OGJ, Nov. 10, 1958, p. 138. The steam requirements for flatter-boiling-range materials (slope of 4° F. per per cent) is indicated in the chart. Only the lower-boiling-range materials and the part of the diagram that pertains to lower percentages vaporized (20-40%) is needed commercially, but the entire diagram is presented so that the full range of behavior can be examined. Conditions vary so widely that it is usually necessary to make computations of the amount of steam required.





G-R Twin G-Fins...versatile and simple

Griscom-Russell Twin G-Fin Sections are the simplest type of heat exchanger—therefore, they're the easiest to maintain and use.

Their simple construction—a finned tube within another tube—makes their operation foolproof and simplifies repair and cleaning when necessary.

Individual Twin G-Fin Units can be connected in series or parallel in any number required for use as gas or fluid heaters and coolers, reboilers, condensers, and vapor and liquid heat exchangers. Capacity can be easily added or removed and the units can be reused in different services and locations easily.

Send for Griscom-Russell Bulletin 1401R

G-R Designed for the Petrochemical Field

Reboilers • Fin Fans • Condensers • Plate Fin Exchangers • Longitudinally and Helically Finned Tubing • Bentube Evaporators • Liquid Heaters • Tubular Heat Exchangers • Solution Heaters • Oil and Water Coolers • Tank Heaters • Gas Coolers • Bentube Sections

Griscom-Russell

GENERAL PRECISION EQUIPMENT CORPORATION

THE GRISCOM-RUSSELL COMPANY, MASSILLON, OHIO

A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION

HEAT EXCHANGE EQUIPMENT FOR THE PETROCHEMICAL INDUSTRY

Four sets of safety rules can cut drilling hazards

IF THE DRILLING CREWS and service company personnel are properly schooled in safety, and proper drilling equipment is available, there are few hazards in air and gas drilling. Most accidents that have occurred in this type drilling can, as in conventional drilling, be traced to personnel carelessness and insignificant importance given to safety planning.

There have been a few underground fires due to a critical mixture of methane or oil and air. In almost every case there was no damage done at the surface and any damage that did occur was generally the overheating of the bit and drill collars. Actually, in experimental work, bottom-hole fires have been very difficult to start and almost impossible to maintain.

The safety suggestions included here are the result of several years of study of air and gas drilling operations in the Rocky Mountain area.

Compressor system . . . That part of the drilling equipment associated with the delivery of compressed air or gas needs some special attention. These precautions are suggested:

1. When terrain permits, compressors should be at least 200 ft. from the rig. Under no circumstances should they be closer than 100 ft.
2. The air-supply line should be located so it doesn't interfere with access to the rig. Where practical it should be buried in the ground.
3. Smoking should not be allowed within 50 ft. of the compressors.
4. All unauthorized personnel must remain away from the compressors.
5. The compressors and rig should be equipped with proper warning signs, which include "No Smoking" and "Caution, Air Drilling In Progress."
6. There should be a distance of at least 6 ft. between compressors.
7. The main fuel and oil storage should be a minimum of 50 ft. from the compressor location and all supply lines should have shutoff valves.
8. Vaporproof lighting should be installed for all night lighting at the compressor location.
9. Fire extinguishers of the chemical type should be placed near the compressor location.
10. The compressors should be visible from the driller's location on the rig.
11. The compressors should be equipped with such safety features as: unloaders, pop valves, temperature and pressure gages, engine governors, and shutoff valves.
12. The compressor engines must be equipped with spark-arresting or water-cooled mufflers.
13. The most desirable compressor units have diesel engines to eliminate the electrical and ignition systems and the use of highly volatile fuel.
14. A qualified compressor technician should supervise the compressors and advise the driller on the air and gas drilling operations.

Rig and equipment . . . These precautions should be observed on and near the drilling rig:

1. The rotating blowout preventer and all air lines should be pressure tested for possible leaks.
2. Vaporproof lighting should be installed for night lighting.
3. Enough fire extinguishers of the chemical type should be available for immediate use. Locate two on the rig floor, one of which should be near the driller.
4. The discharge line should be 7-in. and approximately 300 ft. long. It should be anchored securely in at least three positions and directed either downwind or at right angles of the prevailing wind. A pilot flare should always burn at the end of this line.
5. All valves should be located so they can be safely operated during emergencies.
6. There should be no smoking, matches, lighters, or open fires within 100 ft. of the rig. Appropriate signs should be displayed warning of this danger.
7. A bleedoff line is necessary for quick release of the air or gas pressure to the discharge line in order to make connections.
8. Rig engines should have spark-proof exhausts and all electric motors should be vaporproof.
9. Rig substructure should be well ventilated, either by natural convection or fans.

Prior to Drilling

Advance planning of any air or gas drilling job should include all factors which affect the safe operation of this type of drilling program. Some of the factors which should be considered are as follows:

1. All crew members should be informed of all hazards involved.
2. All lines should be tested for leaks; be certain that the pressure has been released before correcting any leaks.
3. A safety routine and inspection check list for all crew members should be established. This operation can be a simple routine and consume very little time but it should be understood by all concerned.

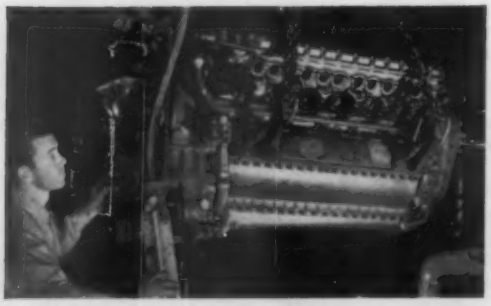
Drilling Operations

As a whole, drilling operations with air or gas require the same type of safety precautions as drilling with liquids. There is actually less danger of unexpected blowouts because formation fluids or gases are under the mechanical control of the rotating blowout preventers. There is no sudden loss of control as when the mud is suddenly ejected from the hole. The following general factors should be especially considered:

1. There should be a float at the lower end of the drill pipe during all drilling. If high-pressure gas is expected, two floats should be used. These floats should be checked each trip out of the hole.
2. When making connections, be certain that all pressure has been released through the bleedoff line.
3. When making trips while the well is producing gas, use the stripper rubber. The stripper rubber should be checked and replaced if any leaks develop during a trip. It should be capable of accommodating all tool joints and drill collars so the entire drill string can be passed through it.
4. Each tour the blowout preventers should be operated to make sure they are functioning properly.
5. All special lines necessary for killing the well should be carefully checked before starting operations; the rig pump should be kept in operating condition during all drilling operations.
6. Use a kelly cock so that all high pressures can be contained inside the drill string.
7. When tripping the pipe, check any sudden changes in the gas flow through the flow line before proceeding or before removing the rotating blowout preventer. It is possible for a bridge to form below the bit which will blow out suddenly as the pressure increases.

This material is taken from a bulletin prepared by Well Completions, Inc., Denver.

DOWELL RECENTLY PERFORMED THIS RECORD-BREAKING HIGH-INJECTION-RATE TREATMENT AVERAGING 71



IN ALL AREAS *now, powerful, remote-controlled Allison-powered pumpers are available to make high-injection-rate fracturing economical. This mighty aircraft engine, heart of the pumping unit, has a maximum rating of 1500 horsepower and delivers 600 hydraulic horsepower from Dowell's high volume pumps.*

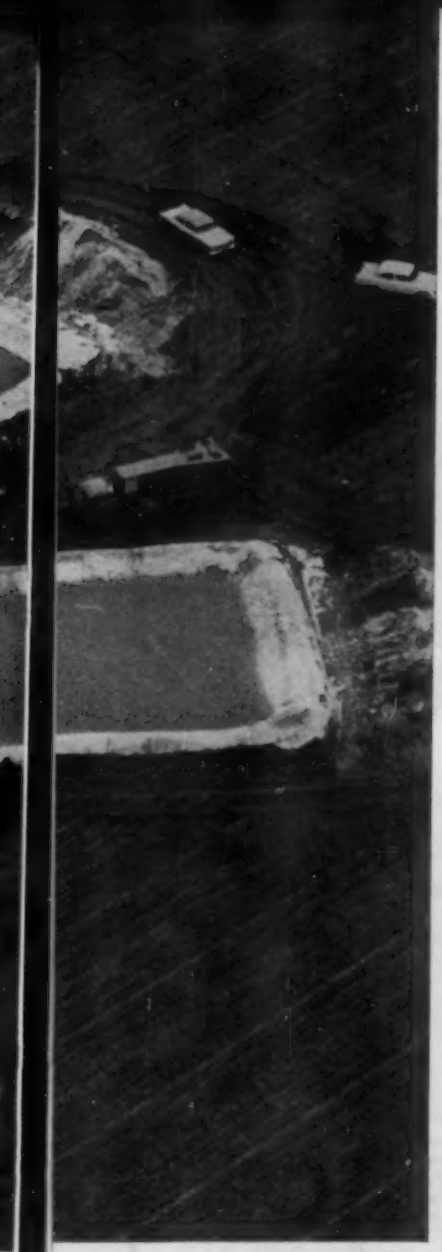
HIGH-INJECTION-RATE FRACTURING BY DOWELL—FOR GOOD ULTIMATE RECOVERY

Many operators are going to high-injection-rate fracturing for one simple reason. It gives them more oil for their money!

At first this may seem strange. More equipment is required for the treatment. The tubing string may have to be pulled.

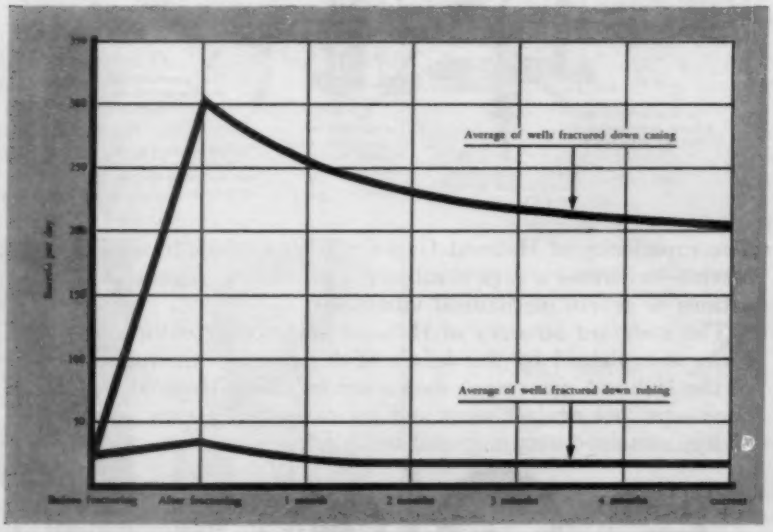
When all factors are taken into consideration, the cost per job is considerably higher—but the results are often startlingly better.

Many wells that do not respond well to fracturing down tubing show excellent results when tubing is pulled and injection rates are increased. The graph on the next page is an example of this fact as proved in one producing field.



BBLS./MIN. WITH 6250 HHP.

NEAR SHREVEPORT, LOUISIANA, as well as other areas, some operators use Fixafrac® or ball sealers to improve the effects of high-injection-rate fracturing. Temporary plugging materials help spread the force of the treatment over the entire face of the pay for better results.



IN YOAKUM COUNTY, WEST TEXAS, a study was made by oil company engineers, comparing the results of high-injection-rate fracturing down casing with low-injection-rate fracturing down tubing. This study showed that casing jobs yielded far better results. The average initial increase was over 12 times as great. More important, however, production held up far better as shown on the graph.

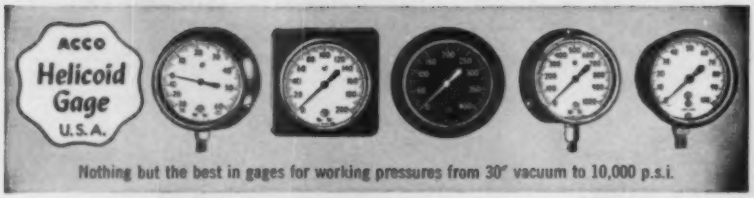
To help make high-injection-rate fracturing practical, Dowell developed the remote-controlled pumper powered by an Allison aircraft engine. This is still the most powerful unit —pound for pound—in general use.

Take advantage of the experience Dowell has accumulated in this service. For full information on the advantages of high-injection-rate fracturing, call any of the 165 Dowell service points. In Canada, contact Dowell of Canada, Ltd.; in Venezuela, contact United Oilwell Service. Dowell, Tulsa 1, Oklahoma.

Services for the oil industry DOWELL

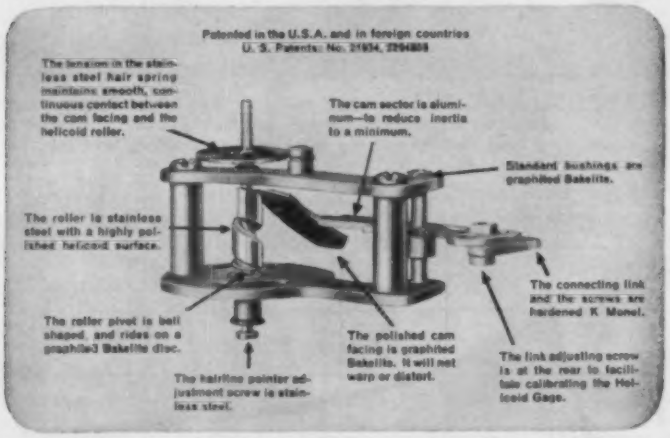
A SERVICE DIVISION OF THE DOW CHEMICAL COMPANY

PULLING TUBING can be one of the greatest aids to high-injection-rate fracturing. Many operators have found that the cost of pulling tubing amounts to only a small per cent of the total cost of fracturing. Yet, the production increase sometimes is more than twice as great as with low injection methods.



Nothing but the best in gages for working pressures from 30" vacuum to 10,000 p.s.i.

These details of Helicoid gage design assure longer life and enduring accuracy


Patented in the U.S.A. and in foreign countries
U. S. Patents: No. 21934, 2294808
The tension in the stainless steel hair spring maintains smooth, continuous contact between the cam facing and the helicoid roller.
The cam sector is aluminum—to reduce inertia to a minimum.
Standard bushings are graphited Bakelite.
The roller is stainless steel with a highly polished helicoid surface.
The connecting link and the screws are hardened K Monel.
The roller pivot is ball shaped, and rides on a graphited Bakelite disc.
The polished cam facing is graphited Bakelite. It will not warp or distort.
The link adjusting screw is at the rear to facilitate calibrating the Helicoid Gage.
The hairline pointer adjustment screw is stainless steel.

The superiority of Helicoid Gages is most evident in severe service—wherever a gage is subjected to violent pressure pulsations or severe mechanical vibrations.

The *sustained accuracy* of Helicoid Gages over *millions of cycles* is explained by the details of design and construction of the Helicoid movement shown above. Such Helicoid features—protect against wear and corrosion and assure sensitivity, sustained accuracy and trouble-free operation.

The Chemical Gage

The Helicoid Chemical Gage has a guaranteed accuracy of plus or minus 1%. It is applicable for working pressures from 30" vacuum to 5000 p.s.i. and temperatures to 400° F. It is particularly suitable for chemicals and other viscous fluids which might clog or corrode a Bourdon tube. Pressure and/or vacuum is transmitted directly to the indicating gage element through deflection of a Teflon or Kel F sealing diaphragm.

Tubes built for millions of pressure pulsations

To fit the wide range of applications, Helicoid Bourdon tubes are available in four materials—alloy steel, K Monel, stainless steel and phosphor bronze.

All Helicoid tubes are made from seamless tubing and are carefully designed to give maximum torque and minimum stress. When used within the dial range, they will withstand many millions of pressure pulsations and will not stretch, leak or crack.

For complete information on the Helicoid line of gages write for Catalog G-52

Helicoid gives you all these features at prices that are competitive in the quality gage field.

Helicoid Gage Division
AMERICAN CHAIN & CABLE

929-A Connecticut Avenue • Bridgeport 2, Connecticut

ACCO

CRUSHPROOF

LEAKPROOF

FLEXIBLE

STAINLESS STEEL LINED FOR VOLATILES...CHEMICALS

Stands pressures up to 200 psi . . . rubber covered and leakproofed with special packing. Safe, sure protection for conveying the most volatile of chemicals and liquids without discoloration, contamination or corrosion. Ideal for handling solvents, special chemicals, high octane gasolines and jet fuels.

It is lighter in weight than any comparable competitive hose . . . easy to handle with swivel flange that allows installation in any position without turning entire hose to meet bolt holes. Available in sizes 2" to 12" I.D. Write for full details to Pennsylvania Flexible Metallic Tubing Co., Inc., 7213 Powers Lane, Philadelphia 42, Pa.

NEW BOOK

Gives complete technical details on flexible tubing. Free copy for you.

PENFLEX

TIGHT AS A PIPE BUT...

FLEXIBLE

Electric-log interpretation

is made easier by the use of nomographs

BY S. H. SOUTHWICK, J. K. KERVER, AND W. O. WINSAUER
Production Research Division, Humble Oil & Refining Co., Houston

THE LAST DECADE has seen much progress toward a better understanding and use of the electric log. Advancements have been made in the development of new and better logging tools and in the improvement of electric-log interpretation. Of particular note is the improved innterpretation of strata which contain large amounts of shale.

In 1953, papers by Perkins et al.,[1] Wyllie and Southwick,[2] Poupen et al.,[3] and more recently by Hilland Milburn,[4] presented a general method of log interpretation which could be used in shaly as well as clean formations. Each of these papers concluded that shaly formations could be interpreted by using an equation of the form

$$SP = -K \log \frac{R_{xo}}{R_o} \qquad (1)$$

where

SP (in millivolts) is the potential between a shale and the shaly stratum of interest,

K is a constant for a particular rock at a given temperature,

R_{xo} (ohm-meters) is the resistivity of the invaded formation completely saturated with mud filtrate, and

R_o (ohm-meters) is the resistivity of the uninvaded formation completely saturated with formation water.

Since previous work[5] had pointed out that an equation of the same form was applicable for clean sands and carbonates, the work in 1953 suggested the use of Equation 1 in interpreting both clean and shaly formations.

The qualitative method of log interpretation suggested by Perkins et al., was based on the following form of Equation 1:

$$SP = -0.11\,(460 + T) \log \frac{R_{xo}}{R_o} \qquad (2)$$

where T (°F.) is the formation temperature.

To use this equation as a basis for a general interpretive method, it must be assumed that the potential is unaffected by hydrocarbons and that the invaded zone is completely saturated with drilling mud filtrate. Then, values of the potential, the formation temperature, and the resistivity of the invaded zone are substituted in Equation 1, and it is solved for the resistivity R_o of the uninvaded formation completely saturated with formation water.

This calculated resistivity of the formation is compared with the resistivity of the uninvaded formation, R_t, as obtained from an appropriate electric log. If R_t is significantly higher than the calculated resistivity, R_o, the formation is assumed to contain hydrocarbons. The ratio R_t/R_o, the resistivity index, is equal to 1.0 for water-bearing formations.

Between 1953 and 1956, this method was applied by the authors to a large number of formations in different geographic locations. In applying the method, the resistivity indexes

STANLEY H. SOUTHWICK joined Humble's production-research division in 1951. He is senior research engineer engaged in well-log interpretation.

J. K. KERVER joined Humble in 1949. He is a senior research engineer in the production-research division, dealing with well-completion problems.

WELDON O. WINSAUER joined Humble's production-research division in 1948. Currently, he is engaged in research on oil recovery.

The authors say this . . .

- A qualitative method of electric log interpretation has been found applicable to both clean and shaly formations.
- The method was found to give a good representation of potential and resistivity data on clean and shaly rocks which contain formation waters of high or low salinities.
- The method requires an accurate measurement of the potential, the resistivity of the mud filtrate, the resistivity of the invaded and uninvaded zones, and an estimate of formation temperature.
- The method of interpretation can be easily performed with nomographs which are provided.

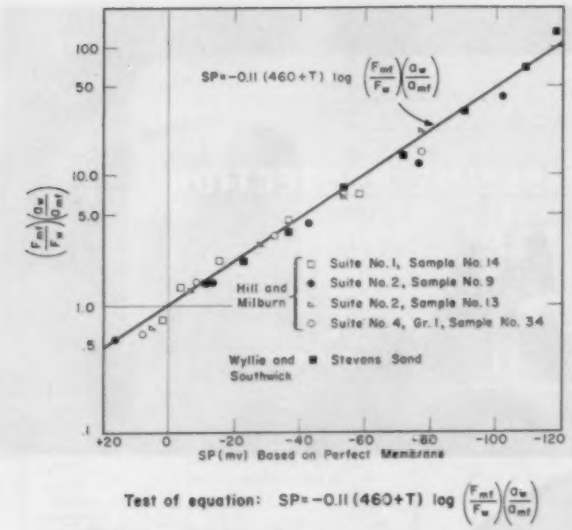
Deep Hole in Assumption Parish. Here's a part of a Falcon Seaboard crew working on a deep-well job in Assumption Parish, Louisiana, just a few miles north of the Gulf. When the picture was taken, they were coming out of the hole, which had reached a depth of more than 13,000 ft. Plans called for setting a string of 7⅝-in. casing, then drilling to a final depth of about three miles.

The rig was equipped with a Bethlehem rotary line, a 1¼-in. rope with tremendous reserve. It had the great strength and toughness that are always needed to handle drill pipe and casing. Bethlehem also furnished the coring line, which was shielded from moisture and gases by a heavy bethanized coating.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

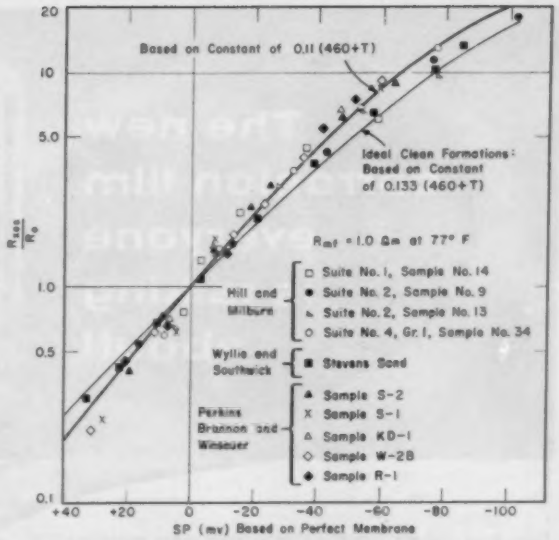
Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

PETROLEUM • CONSTRUCTION • EXCAVATING • MINING • QUARRYING • LOGGING • MANUFACTURING



Test of equation: SP=−0.11 (460+T) log $\left(\frac{F_{mf}}{F_w}\right)\left(\frac{a_w}{a_{mf}}\right)$

LINE REPRESSURING EQUATION 5 agrees with data from several sources. Fig. 1.



COMPARISON OF METHOD of interpretation with potential and resistivity data. Fig. 2.

of known water-bearing zones are usually compared with the zones of interest rather than using an absolute resistivity index as a criterion of possible production. This comparison method was found to be suitable for distinguishing between hydrocarbon-bearing and water-bearing strata in most zones where adequate log measurements were available.

In a few zones, however, the method did not provide as good an answer as was thought possible. An examination of these zones showed the presence of high-salinity formation waters in nearly every case. This suggested the need for a better procedure in zones containing high-salinity formation waters, and in 1956 the method was modified.

This new method has been used effectively for both clean and shaly formations. Since 1956, it has been applied to a large number of formations covering widely different geologic ages and geographic locations. It has given excellent results when the desired electric-log data were available.

Development of General Method

The laboratory measured potentials reported by Wyllie and Southwick and by Hill and Milburn were in the form given by the potential curve of a log while the data of Perkins et al., were analyzed on the basis of laboratory-derived potential and resistivity measurements.

Perkins et al., found that the laboratory measured potential and resistivity characteristics of eight naturally shaly samples were given by the empirical equation.

$$E_{shaly\ sand} = -0.11\ (460 + T) \log \frac{F_w}{F_{mf}} \quad (3)$$

where

E (millivolts) is the potential measured across the sample with respect to the mud filtrate when mud filtrate of resistivity (R_{mf}) and formation water of resistivity (R_w) are in contact with the sample,

T (°F.) is the temperature,

F_w is the resistivity factor when a solution of resistivity (R_w) is saturating the sample, and

F_{mf} is the resistivity factor when a solution of resistivity (R_{mf}) is saturating the sample.

The value of $E_{shaly\ sand}$ is a laboratory measured potential and it cannot be obtained directly from the potential curve of the electric log. On the log, only the difference in potential between shale and the stratum of interest can be measured. Therefore, to simulate the potential characteristics recorded on the log by laboratory data, a difference in potential must be determined between a pure shale and a shaly rock. This difference in potential may be obtained in the following manner.

If it is assumed that the shale behaves as a perfect membrane and that univalent ions are in contact with the shale, the potential difference between formation and mud filtrate separated by the shale is given by

$$E_{shale} = -0.11\ (460 + T) \log \frac{a_w}{a_{mf}} \quad (4)$$

where

a_w and a_{mf} are the mean activities of dissolved ions in the formation water and mud filtrate, respectively. Combination of Equation 3 and 4 permits calculation of the difference in potential across the shale and across the stratum under consideration,

$$E_{shale} - E_{shaly\ sand} = SP = -0.11\ (460 + T) \log \frac{a_w F_{mf}}{a_{mf} F_w} \quad (5)$$

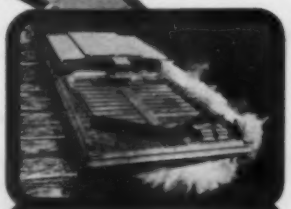
It is this difference which approximates the potential difference opposite shales and other formation rock on the potential curve. Because a part of the above equation was based on data of Perkins et al., a proper test demands that other data be employed. Accordingly, data from Wyllie and Southwick and Hill and Milburn were used (Fig. 1).

Under the assumptions that: (1) shale behaves as an ideal membrane, (2) only univalent ions are in the mud filtrate and formation water, and (3) when applied to a well the streaming potential may be neglected, then Equa-

"This new method has been used effectively for both clean and shaly formations. Since 1956, it has been applied to a large number of formations covering widely different geologic ages and geographic locations."

The new corrosion film everyone is talking about!

Here is an authoritative film that answers many questions on the theory of corrosion and demonstrates methods by which it is controlled. Presented in color and sound, it ranges from the formation of anodes and cathodes through the use of galvanizing, inhibitors, metallizing, cathodic protection, alloys and protective coatings. You will see how many corrosion problems in industries such as yours are being solved by Dimetcote, a one-coat zinc silicate protective coating. This film will be well worth 19 minutes of your time. To arrange a showing for you and your associates, or to learn when it will be shown in your area, contact any of the Amercoat offices listed below.



Typical audience reactions:

Bishop, Tex.—"Planning fair-sized test after seeing this film."

Louisville, Ky.—"Answers many questions. Second showing arranged."

Cincinnati, Ohio—"Key personnel evidenced considerable interest."

Netherlands Antilles—"Both shows led to 45-minute discussions."

Fairport, Ohio—"Very interesting. Will try methods shown."

Las Piedras, Venezuela—"Putting ideas to work in near future."

Bartlesville, Okla.—"Viewed by 42 key men from five divisions."

Answers these and other questions:

What produces electrolytic corrosion?

What factors favor hot-dip galvanizing?

How important is surface preparation?

Can a coating survive a tank fire?

Can rust in tankers be controlled?

Can a coating offer cathodic protection?

What are the corrosion problems on offshore rigs?

What are the advantages of zinc silicate?

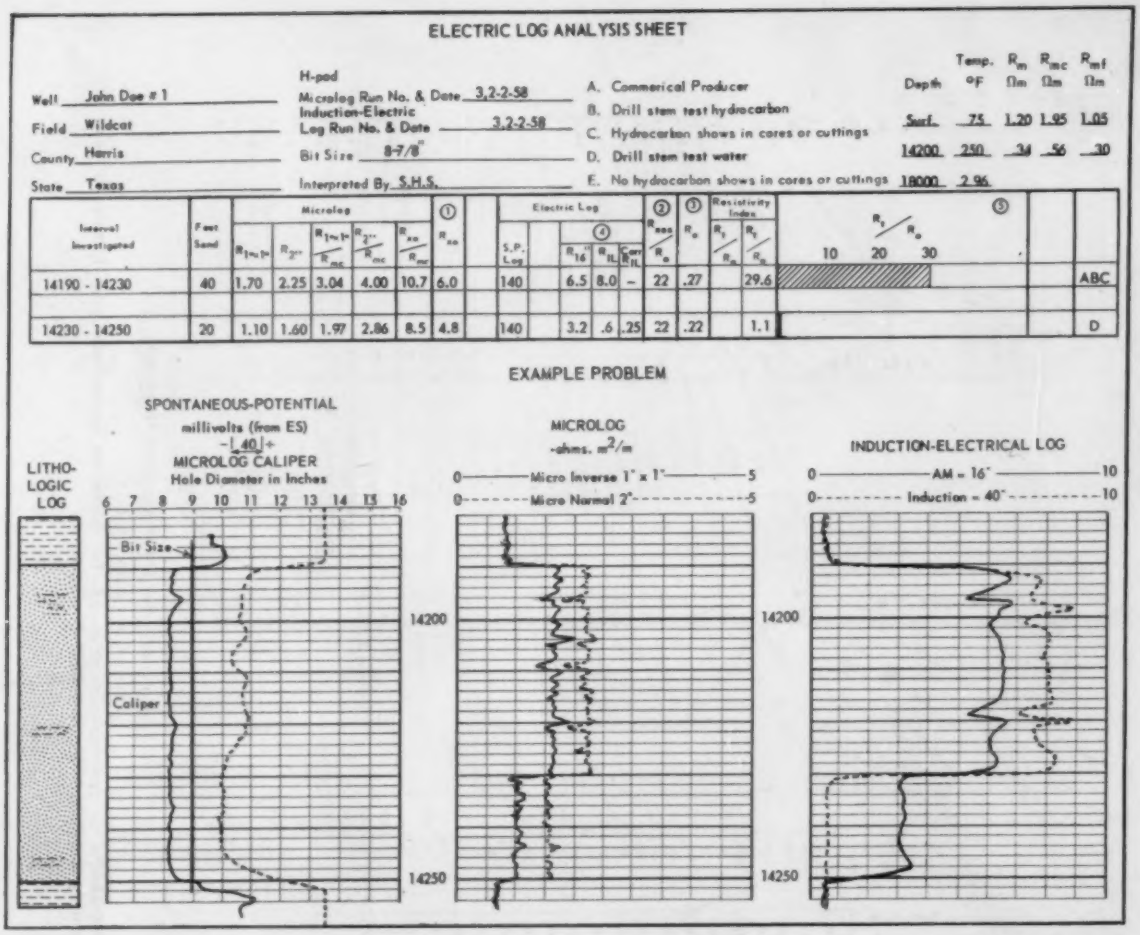
How can chemical plants cut painting costs?

Amercoat® CORPORATION

Dept. CK • 4809 Firestone Boulevard
South Gate, California

• 921 Pitner Avenue • Evanston, Illinois
• 2404 Dennis Street • Jacksonville, Florida
• 360 Carnegie Avenue • Kenilworth, New Jersey
• 6530 Supply Row • Houston, Texas

113A



LOG DATA are recorded on an electric-log analysis sheet. An example is used above, with the appropriate information being entered in the analysis sheet at top. Fig. 3.

tion 5 relates the potential and resistivity of shaly formations.

The resistivity factors F_w and F_{mf} usually are not estimated from log readings. However, the formation resistivities R_o and R_{xo} are obtained in this way, and they are related to F_w and F_{mf} by

$$F_w = R_o/R_w \text{ and } F_{mf} = R_{xo}/R_{mf}$$

Making these substitutions, equation 5 may be written as

$$SP = -0.11\ (460 + T) \log (a_w/a_{mf})\ (R_w/R_{mf})\ (R_{xo}/R_o) \quad (6)$$

An inspection of the formation measurements related in the above equation suggests that R_o cannot be obtained from log measurements alone. For example, before Equation 6 can be used to estimate R_o one must know the potential, the resistivity of the invaded zone, the the resistivities and mean ionic activities of the mud filtrate and formation water.

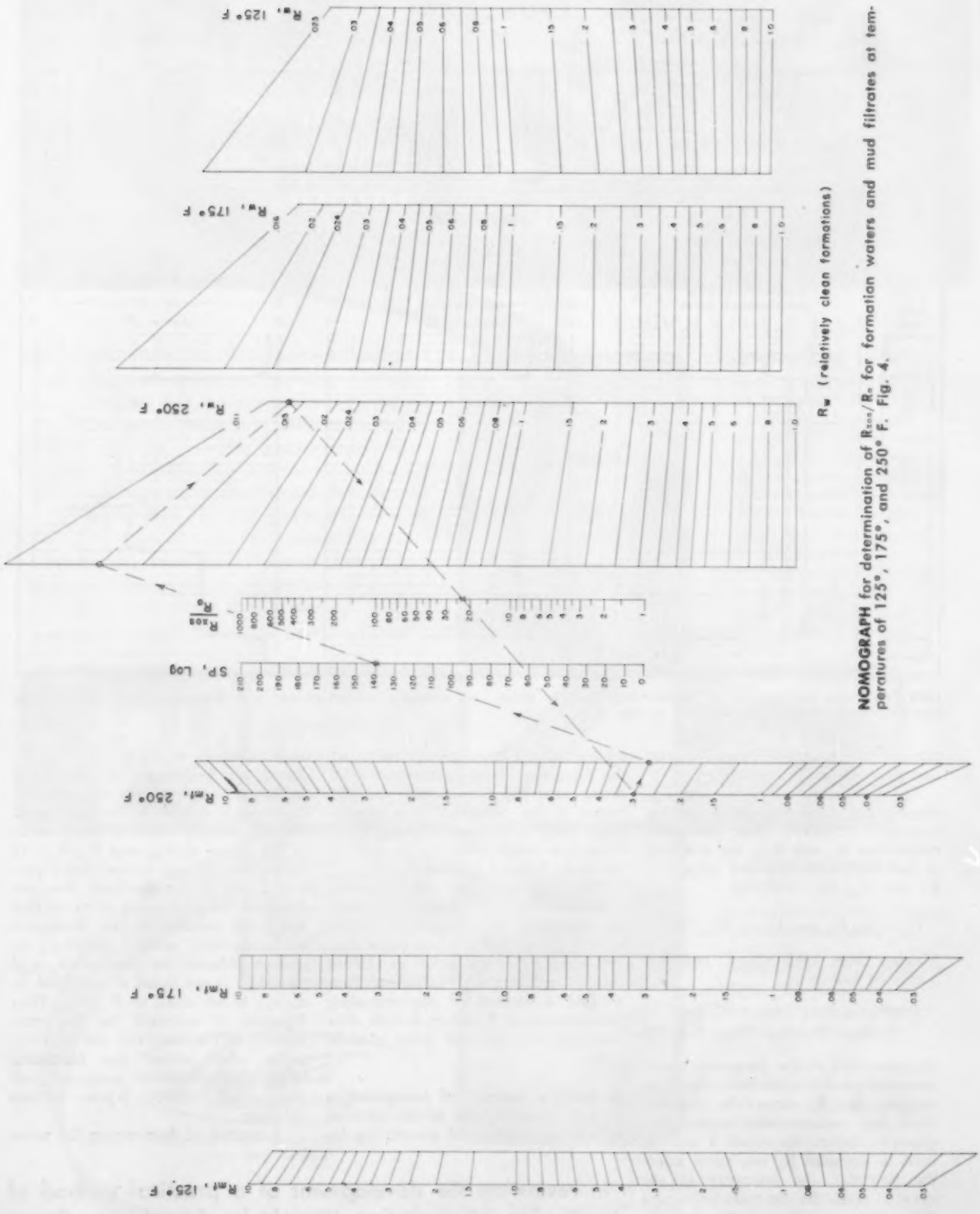
The value of R_o, however, can be determined from information available on logs if the ionic concentration of the formation water is determined by direct analysis. It can also be obtained if the potential of a nearby clean sand is assumed to arise from formation water identical to that in the shaly sand of interest.

These methods are not generally applicable, however, because a direct measurement of formation water salinity or a clean stratum containing the same formation water is seldom available. It was necessary, therefore, to find a method of approximating the solution of Equation 6 with data that can be obtained from electric logs.

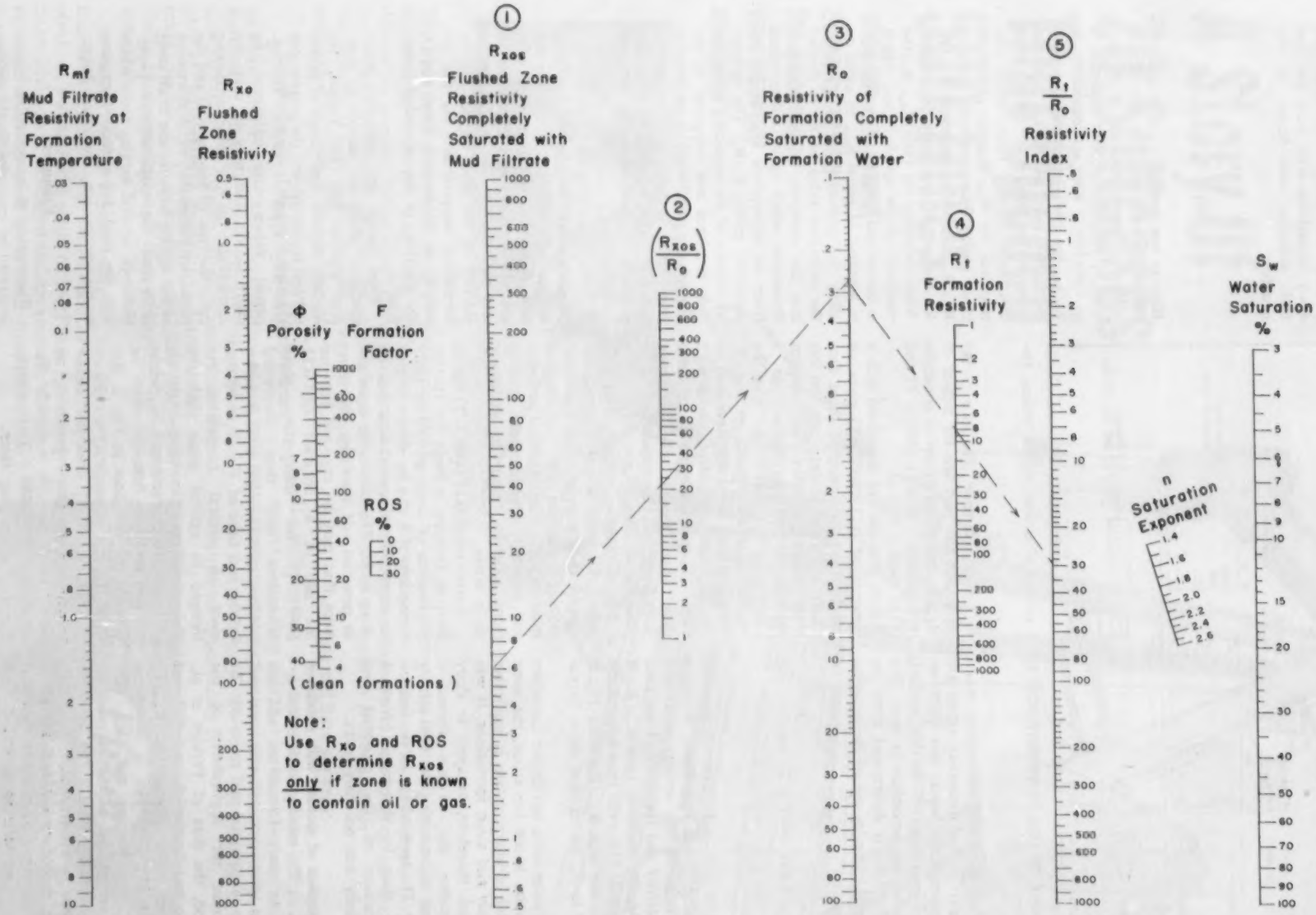
A possible method of interpretation . . . In reviewing the development of a practical method of electric-log interpretation, it might be desirable to discuss why Equation 2 can be used in an interpretation procedure and why Equation 6 cannot. It may be noted that Equation 6 contains the product of the ratios a_w/a_{mf} and R_w/R_{mf}. If the product is equal to one, then Equation 2 and 6 are identical. But analysis of the two ratios revealed that when the salinity of the formation water exceeds about 20,000-p.p.m. sodium chloride the product (a_w/a_{mf}) (R_w/R_{mf}) is not equal to one; that is, a_w/a_{mf} is not equal to R_{mf}/R_w. Thus Equation 6 accounts for the non-equality of the resistivity and activitity ratios when either the formation water or mud filtrate contains more than about 20,000 p.p.m. sodium chloride.

A method of determining the ratios

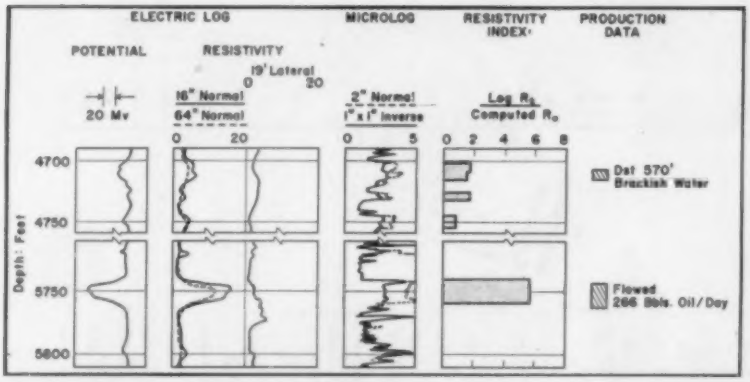
"In reviewing the development of a practical method of electric-log interpretation, it might be desirable to discuss why Equation 2 can be used in an interpretation procedure, and why Equation 6 cannot."



NOMOGRAPH for determination of R_{xo}/R_o for formation waters and mud filtrates at temperatures of 125°, 175°, and 250° F. Fig. 4.



FIVE-STEP PROCESS with this nomograph gives R_o and resistivity index. Fig. 5.



EXAMPLE OF LOG INTERPRETATION for a section of a well in the Wilcox formation. Fig. 6.

R_{xo}/R_o for clean formations when the activity and resistivity ratios are not numerically equal has been reported previously.[4 6] In this method, the following procedure is used. The activity ratio is determined from the potential curve by use of the equation

$$SP = -0.133\ (460 + T)\ \log \frac{a_w}{a_{mf}} \quad (7)$$

where

0.133 (460 + T) is the constant for an ideal clean formation. From a knowledge of the activity ratio and the activity and resistivity of the mud filtrate, the resistivity ratio R_{mf}/R_w is computed. This ratio then numerically equals the ratio R_{xo}/R_o, since F_{mf} is equal to F_w for an ideal clean formation.

Previous work has shown that when the water is not too saline, the same method of interpretation is applicable to shaly and clean formations. It was decided, therefore, to apply to shaly formations the clean formation method of correcting for high-salinity water. The applicability of the method could then be determined from a comparison of the potential and resistivity data on shaly rocks.

Comparison of method with published data . . . The same procedure was applied to shaly formations, and the results were compared with measured values of potential and resistivity. To determine the applicability of the method, the data of Perkins et al., Wyllie and Southwick, and Hill and Milburn were plotted as R_{xo}/R_o against SP. This plot is shown in Fig. 2. In plotting the data, they were normalized so that a mud filtrate resistivity of 1.0 Ωm at 77°F was used as a reference.

The procedure outlined for clean sands was used to compute the ratio R_{xo}/R_o for different potentials with R_{mf} as a reference. The two curves shown on the plot are for values of R_{xo}/R_o calculated by use of constants in Equation 7 of 0.11 (460 + T) and 0.133 (460 + T).

Note that the line computed with a constant of 0.11 (460 + T) gives an excellent representation of these data when the formation water contains less than about 40,000-p.p.m. sodium chloride, which corresponds to a potential of less than 60 mv. with the R_{mf} used as a reference in Fig. 2. Note also that a line corresponding to an intermediate constant, about 0.12 (406 + T), gives a better fit of these data when the salinity is above 40,000 p.p.m., corresponding to a potential of over 60 mv.

For all salinities, a constant of 0.11 (460 + T) gives a good representation for these samples which contained varying amounts of argillaceous material and which exhibited potential and resistivity characteristics grading from relatively clean to extremely shaly sands.

A constant of 0.11 (460 + T) can be used in forming a basis for the interpretation of clean as well as shaly formations if it can be shown to give an acceptable agreement with data on clean rocks. The maximum departure in potential and resistivity characteristics that may be expected between the use of a constant of 0.11 (460 + T) for interpreting clean formations and their theoretical constant of 0.133 (460 + T) is shown by the two lines of Fig. 2. However, since all natural formations are thought to exhibit some shale-like characteristics, clean earth materials probably are characterized by potential and resistivity behavior which lie between the two lines in Fig. 2. Because the line representing a constant of 0.11 (460 + T) does not depart materially from that representing an ideally clean rock, it is thought the constant of 0.11 (460 + T) is acceptable for interpreting them.

As a result of this comparison, the method for interpreting clean and shaly formations with both low and high salinities was based on the equation.

$$SP = -0.11\ (460 + T)\ \log\ a_w/a_{mf} \quad (8)$$

How to use method . . . In applying the method the potential, SP, is read from the potential curve. It is then used in conjunction with Equation 8 to calculate a ratio corresponding to a_w/a_{mf} for relatively clean rocks. This calculated ratio of a_w/a_{mf} and the resistivity of the mud filtrate then determines another ratio, which corresponds to R_{mf}/R_w for relatively clean rocks. This computed ratio of R_{mf}/R_w is assumed to equal R_{xo}/R_o for both clean and shaly formations. After obtaining the ratio R_{xo}/R_o, the resistivity of the invaded zone, which is determined from an appropriate log, is assumed to equal R_{xo} in order to allow the estimation of R_o. Finally, the estimated value of R_o is divided into the resistivity of the uninvaded formation, which again is determined from an appropriate log, to get the resistivity index, R_t/R_o. The resistivity indexes of the respective zones are then tabulated and compared to determine the possible oil or gas-bearing formations. An index of 1, of course, indicates water, whereas an index appreciably higher than 1 indicates hydrocarbons.

Measurements required . . . This method of interpretation requires certain formation measurements. They are: (1) the potential between a shale and the zone of interest, (2) the resistivity of the mud filtrate, (3) the formation temperature, (4) the resistivity of the invaded zone, and (5) the resistivity of the uninvaded formation.

Even though the formation measurements which are needed to interpret electric logs are known, the method requires true values of potential and resistivity, and the present logs give only apparent values. The apparent values are influenced by many factors and may or may not approximate the true value, depending upon the type of logging tool and the particular circumstances. A discussion of the logging tools for use in all cases is beyond the scope of this paper. However, several logging tools which may be used for certain formation measurements are illustrated later.

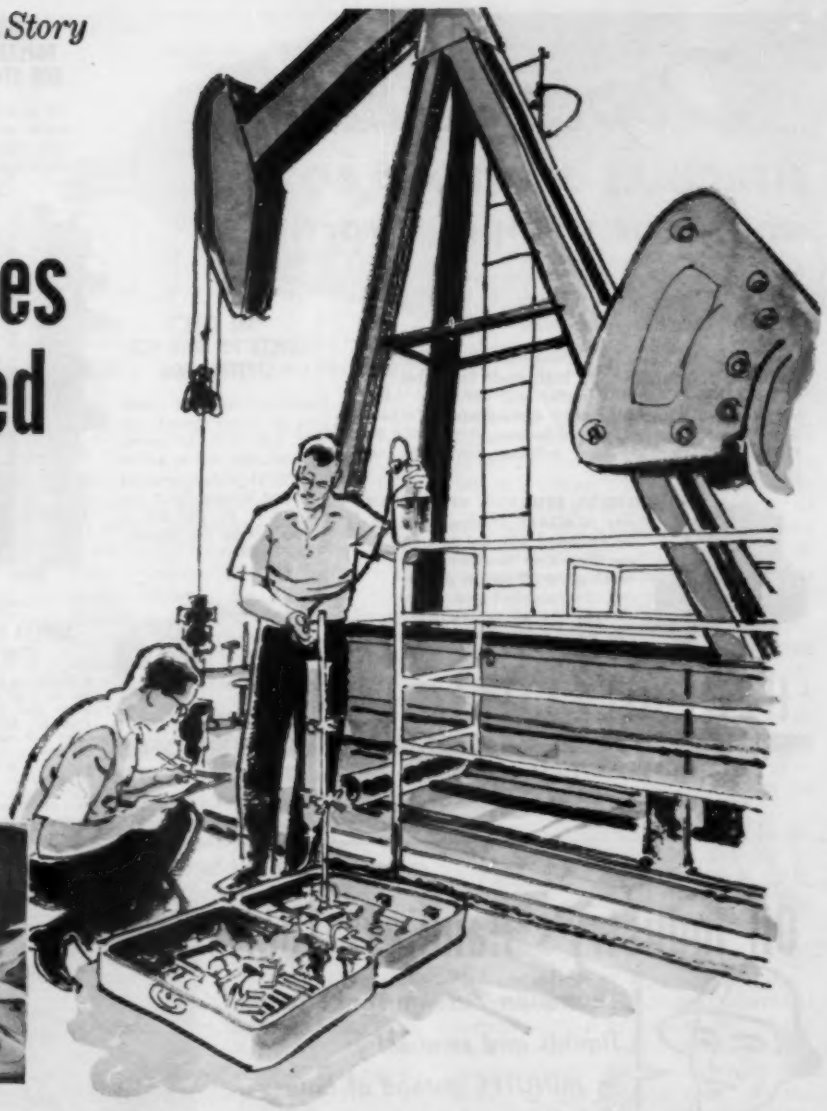
Examples

The method of interpretation is best illustrated by examples. In the follow-

1958 Summer Success Story

A Story Of 20 Suitcases That Opened 500 Times

with an important demonstration for secondary oil recovery operators



The man you see above is one of 20 young chemical engineering students who have, since June, conducted an unusual "flow rate" demonstration for secondary recovery operators throughout the Southwest. It's all been part of *Program 20*, inaugurated by Chas. Pfizer & Co., Inc.

Conclusive Proof of Citric Acid Effectiveness

In more than 4 out of 5 tests, conducted at the well head, citric acid significantly improved water injection flow rates. Program 20 representatives were able to demonstrate graphically citric acid's remarkable ability to sequester iron salts preferentially thus *preventing "iron plugging" of the sandface.*

If water flooding is your business, and you were unable to invite a *Program 20* man for this demonstration, you can still write to the Pfizer Chemical Sales Division in Brooklyn and arrange for a Pfizer representative to visit your well head with the water quality kit.

He will also give you information on the use of citric and gluconic acids with detergents in well clean out procedures, and information on the use of these same acids in HCl acidizing.

Test and Data are Free!

He will leave you a complete and valuable test report plus a Fact File that includes comprehensive technical information and research data for secondary oil recovery. Why not take advantage of this unusual opportunity?

Chas. Pfizer & Co., Inc.
Chemical Sales Division
630 Flushing Ave.
Brooklyn 6, N.Y.

Pfizer

PROGRAM 20

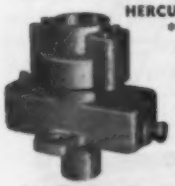
Branch Offices:
Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Tex.; Clifton, N. J.

Dependable

HERCULES STUFFING BOXES end Your pumping worries*

HERCULES Duplex Polished Rod Stuffing Boxes are constructed from high grade malleable iron (55,000 PSI Tensile Strength) and are rated 3,000 pound test. Flexibility and the cone-shaped Packing Rings are the combination of factors which make the HERCULES Stuffing Box without equal for any pumping situation.

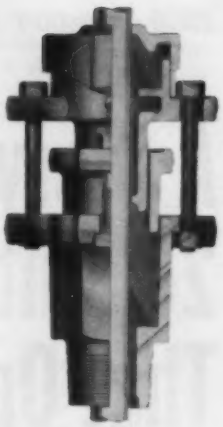
HERCULES OIL RESERVOIR UPPER GLAND



**Any HERCULES Stuffing Boxes may be equipped with Oil Reservoir Upper Glands on "problem" wells which pump-off and burn packing. The polished rod moves through the oil in the reservoir which lubricates and cools it.*

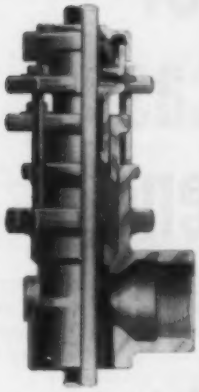
"REGULAR TYPE" DUPLEX POLISHED ROD STUFFING BOX

The old reliable; tried and proved on thousands of wells from coast to coast and in many foreign fields.



"TEE TYPE" DUPLEX POLISHED ROD STUFFING BOX

HERCULES "TEE TYPE" Stuffing Box is very compact, only 15" high. It is full opening which allows rods to be run or pulled without removing Stuffing Box body. It is furnished in 2", 2½" and 3" sizes with any API Tubing or Line Pipe Thread.



"TYPE DP" DUPLEX POLISHED ROD STUFFING BOX

A double packed Stuffing Box for use on high pressure wells and those that flow intermittently. Especially desirable for wells located near buildings, fire hazards or growing crops. Two compression bolts, in bottom sections, are tightened on lower packing set while replacing packing in upper section. Possess same flexibility as the regular and Tee base type.

HERCULES TOOL Company

"MANUFACTURERS OF OIL FIELD EQUIPMENT" SINCE 1924

GENERAL OFFICES AND PLANT — TULSA, OKLAHOMA

Export Representative: Oil Field Equipment Co., Inc., 90 West Street New York 6, N. Y.

Oil Industry's Handiest Tool!

Thompson Vacuum Tanks handle liquids and semi-solids in MINUTES instead of hours!

"It's our handiest tool!" That's what they're saying about the Thompson Unitized Vacuum Tank, and once you've tried it, you'll agree. There's absolutely no substitute when it comes to moving liquids and semi-solids in a hurry.

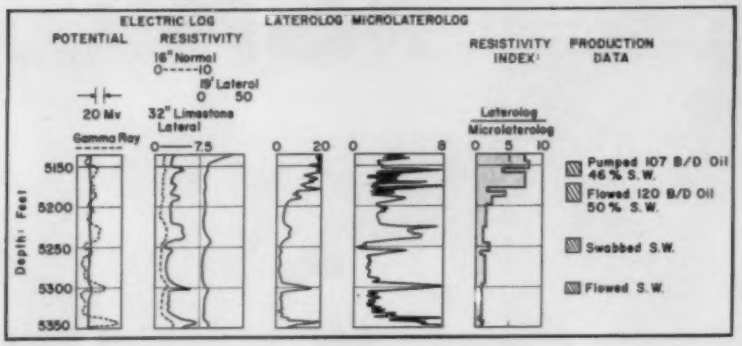
- *Jobs which once took hours are now on the way in minutes.*
- *Jobs which once called for crews are handled by a single driver-operator.*

Versatile vacuum is a real "go-getter" in all departments: refining, drilling, producing and pipeline. Fast pick-up, transport and discharge make the Unitized Vacuum Tank indispensable to modern cost-conscious operations.

Write today for specifications and the name of those in your area who are operating a Thompson Vacuum Tank. See it in action.

THERE IS A THOMPSON UNITIZED VACUUM TANK FOR YOUR NEEDS. CAPACITIES RANGE FROM 30 TO 100 BBL. COMPLETE UNITS CAN BE SKID, TRUCK, SEMI-TRAILER OR TRAILER MOUNTED.

Sole Licensee to Manufacture Vacuum Tanks Under U. S. PATENT NO. 2522077.



USE OF RESISTIVITY INDEX in interpreting focusing logs made in salty mud. Fig. 7.

ing paragraphs the procedure is described for an artificial example, and the results of the method of interpretation are illustrated for two actual wells.

Problem . . . The section of the well used for the example interpretation problem is shown is Fig. 3. It is assumed that the MicroLog and induction-electric log give readings as indicated in Fig. 3. In the example, the method of interpretation is illustrated on zones of 14,190-14,230 ft. and 14,230-50 ft.

Recording basic data . . . The first step in any interpretive procedure is to record the log data in a convenient form. The upper portion of Fig. 3 demonstrates one such form. Spaces are provided to record available data on the well, mud, formation temperature, and log readings.

Resistivity of flushed zone, R_{xo} . . . The resistivity of the flushed zone is normally determined from a short spacing, contact-type log. Many such devices are commercially available. In the present example, the MicroLog was used to indicate the resistivity of the invaded zone.

To determine the invaded-zone resistivity from MicroLog readings, first the resistivity readings of the 1 x 1 and 2-in. spacing curves were divided by the resistivity of the mud cake, R_{mc}. This ratio was then used in conjunction with correction charts, which were furnished by the service company, to determine the ratio R_{xo}/R_{mc} and the resistivity of the invaded zone, R_{xo}. This value of R_{xo}, 6.0 Ωm for the 14,190-14,230-ft. interval, is then recorded in the analysis sheet as Step 1 in the interpretive procedure.

Resistivity ratio, R_{xos}/R_o . . . The next step is the determination of the ratio R_{xos}/R_o. As this ratio is the basis for the method, its determination will be discussed.

First, the potential between the bed of interest and the zone under consideration is analyzed for possible geometric correction as has been discussed by Doll.[7] If the zones under consideration are 20 or more feet in thickness, no geometric corrections are normally needed. As a result, in the present case the recorded potential is the maximum potential which is developed, and it can be used directly.

The maximum potential and the resistivity of the mud filtrate at the temperature of the formation are used to determine the resistivity ratio from an appropriate nomograph. One such nomograph, shown in Fig. 4, was prepared primarily from activity data obtained from Harned and Owen[8] and Gondouin et al.,[6] and resistivity data from Rodnyanskii.[9]

It is in a form different from that presented by Gondouin et al., and contains R_{xos}/R_o determinations for formation waters and mud filtrates at temperatures of 125°, 175°, and 250° F. No attempt has been made to incorporate the effect of ions other than sodium and chloride into the determination of R_{xos}/R_o. However, this could and should be done when analyzing strata which contain formation waters with high percentages of other ions such as magnesium or calcium.

In the use of the nomograph for the present example, the maximum potential, 140 mv., and the resistivity of the mud filtrate, 0.30 Ωm, are entered into the nomograph as shown by the dashed lines and arrows for the formation temperature of 250° F. If the formation is known to be relatively clean, the nomograph provides a means of estimating the resistivity of the formation water, 0.014 Ωm. The points corresponding to the resistivity of the mud filtrate and the computed formation water resistivity are then connected, and the intersection of this line with the column marked R_{xos}/R_o gives its value. In this case R_{xos}/R_o is 22 and entered as Step 2 in the interpretive procedure.

Determining of R_o . . . The resistivity of the formation completely saturated with formation water R_o, is calculated from a knowledge of the resistivity ratio and the resistivity of the invaded zone. If the formatiton is not definitely known to contain hydrocarbons, the invaded zone is assumed to be completely saturated with drilling mud filtrate so that R_{xo} is equal to R_{xos}. Then R_{xos}/R_o is equal to R_{xo}/R_o. The values of R_{xos}/R_o and R_{xo} are then used in conjunction with the nomograph exhibited in Fig. 5 to determine R_o.

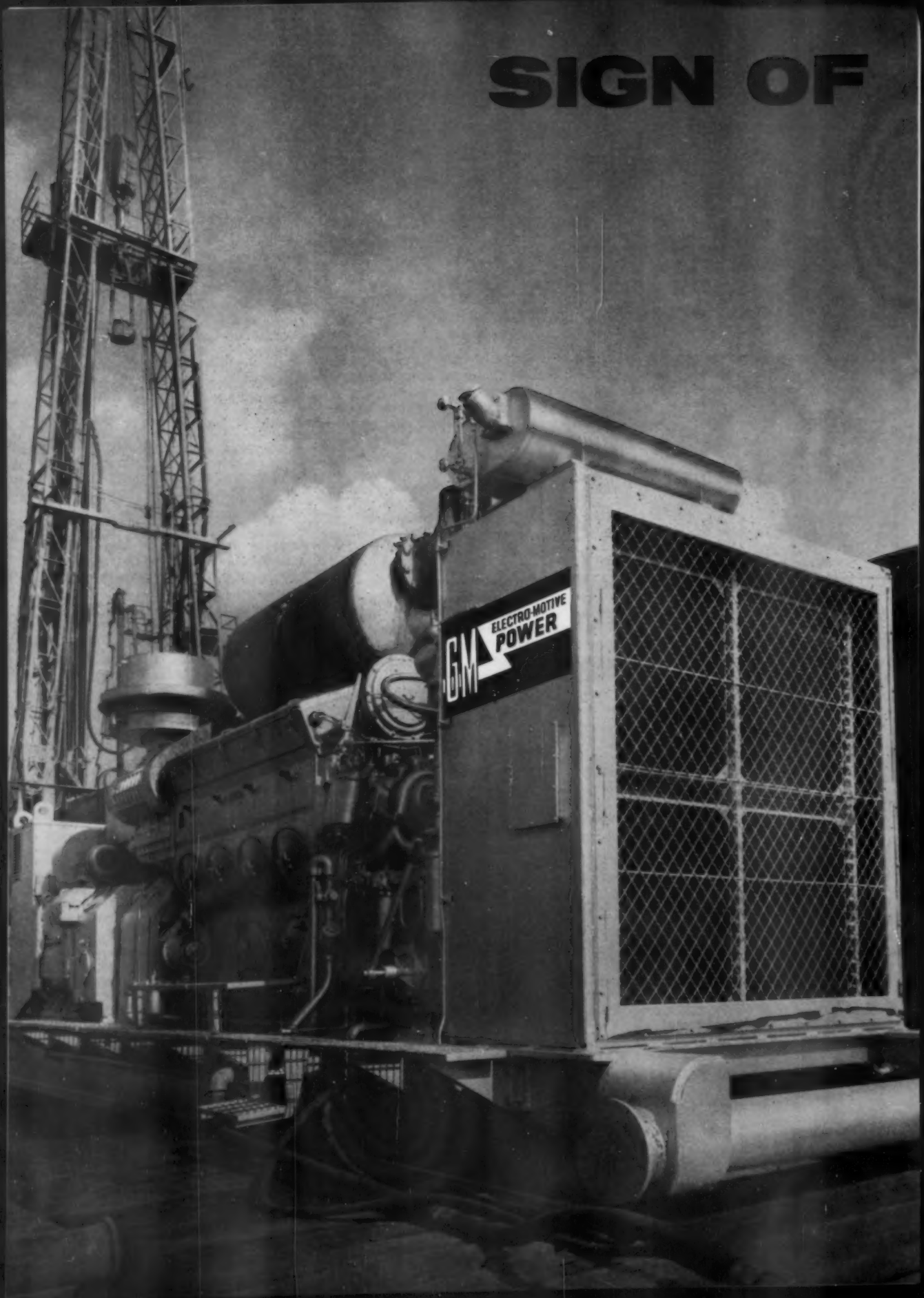
In use of this nomograph, the value of R_{xo} is entered in the column marked R_{xos}, and the value of R_{xos}/R_o is entered in the column so marked. A straight line is then drawn through the values of R_{xos}/R_o and R_{xos} to intersect the column labeled R_o. The value of R_o at the intersection is the desired answer.

In the present example, for the interval 14,190-14,230 ft., a value of 6.0 Ωm for R_{xo} and 22 for R_{xos}/R_o give a computed R_o of 0.27 Ωm. This value of R_o is entered as Step 3.

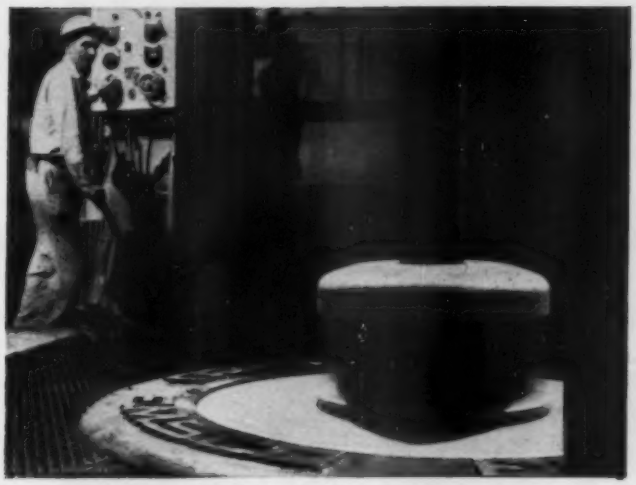
Determination of R_t . . . The resistivity measurement of the uninvaded formation R_t is influenced by: (1) the resistivity of the mud, (2) the size of the well bore, (3) the resistivity and extent of the invaded zone, (4) the thickness of the stratum being investigated, and (5) the resistivity of adjacent beds. No universal logging device exists for this measurement—each tool has its shortcomings and advantages under specific conditions. In most cases either a long spacing curve of the electric log, a focusing electric log, or an induction log is used.

In the present example the resistivity of the uninvaded formation is obtained from the induction log. For the interval from 14,190-14,230 ft. the log

"Experience has shown that the resistivity indexes of completely water-saturated zones often are appreciably greater than one. This shift appears to be either the result of a systematic error in the log readings or a violation of the assumptions which were necessary in deriving the interpretive method, such as no streaming potential and only univalent ions in the drilling mud and formation water."


SIGN OF
GM
ELECTRO-MOTIVE
POWER

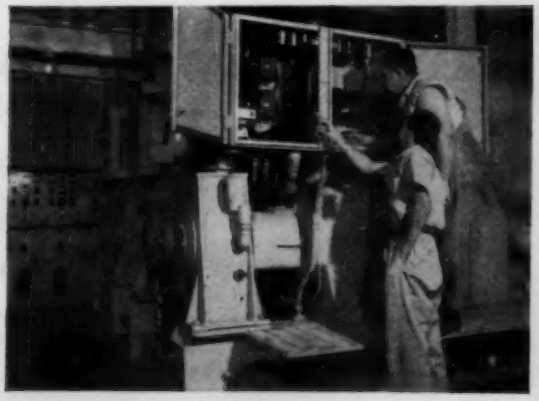
DEEP DRILLING . . .



Sign of fast, economical drilling. Each generating unit has a 1000 hp Diesel driving two 640-kw generators. Drive motors deliver up to 800 hp each. These motors are working now on the largest draw works, mud pumps, rotary tables. This is the power that goes deep. This is the power that drills fast at low cost.

Sign of tested, dependable power. Electro-Motive Power is used on more Diesel-electric rigs than any other make. Good reason, too. Electro-Motive builds the *complete* system. Components are designed as an integral unit—matched to work better, last longer.

Sign of sensitive, accurate control. Electro-Motive controls combine the "feel of steam" with the instantaneous response and accuracy of electric drive. Centralized panel gives driller supervision of all Diesel-electric equipment including safety shutdown.



Sign of one manufacturing responsibility. From rig planning through operation. One responsibility simplifies engineering, installation. It means one source for service, parts. It's yours with Electro-Motive Power.

ELECTRO-MOTIVE DIVISION · GENERAL MOTORS

LA GRANGE, ILLINOIS **Sales-engineering offices:** Chicago, New York, St. Louis, San Francisco *In Canada:* **General Motors Diesel Limited,** London, Ontario

HENRY H. PARIS DISTRIBUTOR, Inc.

OIL WELL, REFINERY AND INDUSTRIAL SUPPLIES

1125 ROTHWELL ST. • P. O. BOX 932 • HOUSTON, TEXAS

Agent and Distributor for the Following Nationally Known Manufacturers:

ALTEN FOUNDRY & MACHINE WORKS
Lancaster, Ohio
Surface Equipment.

DRESSER MANUFACTURING DIV.
Bradford, Pa.
Seamless Welding Fittings, Couplings and Sleeves.

THE FAIRBANKS COMPANY
Binghamton, N. Y.
Bronze and Iron Valves.

THE GORMAN RUPP COMPANY
Mansfield, Ohio
Centrifugal Pumps.

HARRISBURG STEEL COMPANY
Harrisburg, Pennsylvania
Forged Steel Flanges and Seamless Casing Couplings.

LOS ANGELES BOILER WORKS, INC.
Los Angeles, Calif.
Welding Caps—Dished & Flanged Heads.

MILLS IRON WORKS, INC.
Los Angeles, Calif.
Seamless Swage Nipples, Bull Plugs & Welding Reducers.

OIL STATES EQUIPMENT COMPANY
Houston, Texas
OSECO Silvertop Fusible Plugs with renewable inserts for all types OIL COUNTRY BOILERS.

STEEL FORGINGS, INC.
Shreveport, La.
Weld Saddles.

VOLCANO BURNER COMPANY
Houston, Texas
Volcano Superior and Gulf States All Steel Gas Burners for OIL COUNTRY BOILERS.

WESTERN SAFETY BARREL STAND
Houston, Texas
Stand lifts, holds, tilts 55 gal. barrels Prevents spillage—easily loaded.

WHEELING MACHINE PRODUCTS CO.
Wheeling, West Virginia
XL Steel Pipe Couplings for OIL COUNTRY TUBULAR PRODUCTS.

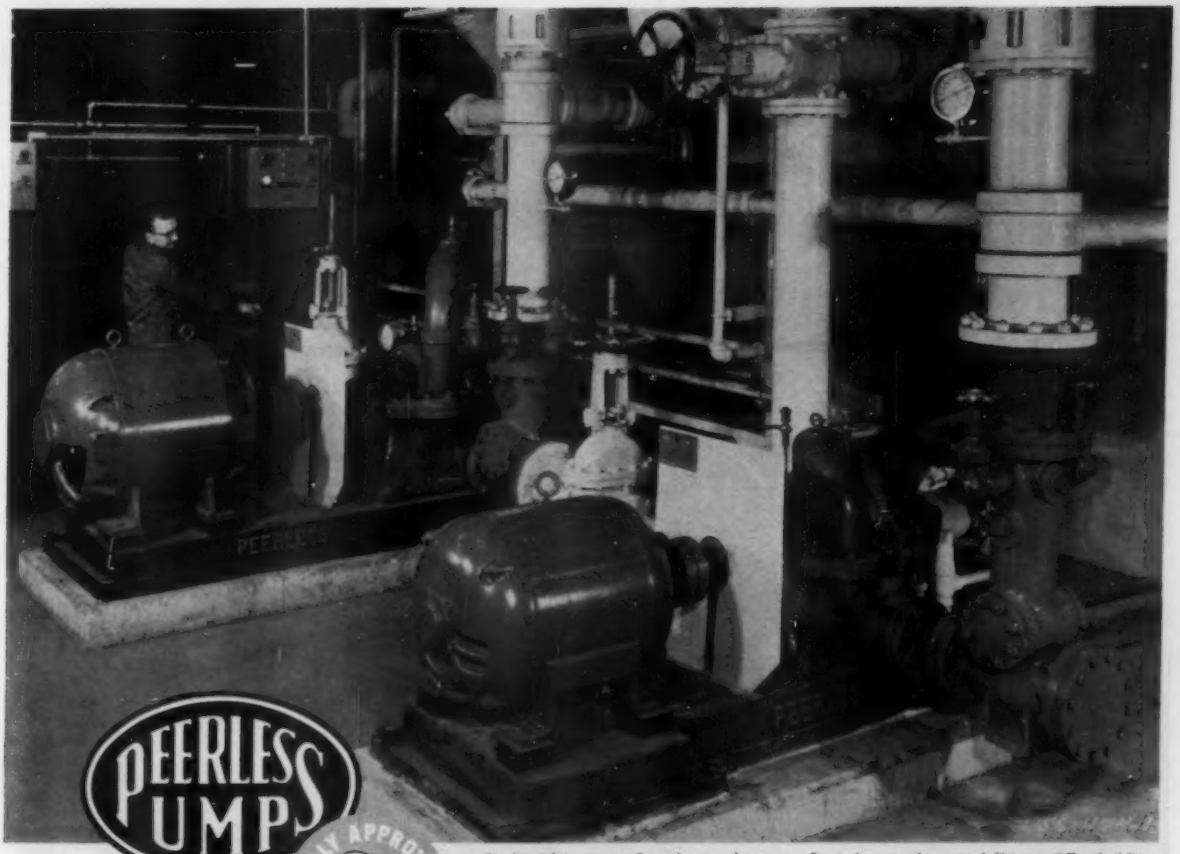
reading, 8.0 Ωm., is taken as the true formation resistivity. The value of 8.0 is recorded for Step 4.

Resistivity index . . . The resistivity index is the uninvaded zone resistivity (R_t), as determined from the appropriate log, divided by the computed resistivity of the water-saturated formation (R_o). A means of dividing these two quantities is provided by aligning the value of R_o and R_t and reading the ratio from Scale 5. In the present example, for an R_o of 0.27 Ωm and an R_t of 8.0, the resistivity index is 29.6. A comparison of a resistivity index of 29.6 with one of 1.1 for the lower interval suggests the presence of hydrocarbons in the upper interval and water in the lower interval.

Experience has shown that the resistivity indexes of completely water-saturated zones often are appreciably greater than one. This shift appears to be either the result of a systematic error in the log readings or a violation of the assumptions which were necessary in deriving the interpretive method, such as no streaming potential and only univalent ions in the drilling mud and formation water. The shift toward higher indexes has been found to affect those of the hydrocarbon-bearing zones in the same manner, so that they continue to show higher indexes than water zones. A plot of resistivity indexes on the analysis sheet in bar-graph form, as shown in Fig. 3, readily portrays the difference between water and hydrocarbon-bearing zones.

Actual well examples . . . Resistivity indexes, calculated in the manner just described, have been found to differentiate hydrocarbon-bearing from water-bearing formations if the desired formation measurements can be obtained from the log readings. Illustrated in the following examples is the use of the resistivity index in interpreting (1) a well logged with an electric log and a contact-type log and (2) a well logged with two focusing types of logs.

Example 1 . . . For many wells, the resistivity of the uninvaded zone is difficult, if not impossible, to determine because of extremely deep invasion of the mud filtrate. This is often the case when interpretation of logs in the Wilcox formation is undertaken. An example of log interpretation for a section of a well in the Wilcox formation is shown in Fig. 6. Deep invasion of the sands in this well is indicated by the decrease of resistivity with increasing electrode spacing; for example, the log readings opposite the sands at approximately 4,710 and 4,750 ft. were less for the 19-ft.



PEERLESS FULLY APPROVED FIRE PUMPS . . .

Prudential Insurance Co. takes no chances on fire in its recently erected Chicago Office Building. Peerless pumps give immediate protection against fire *automatically*, without human attention.

HOW TO DEAL WITH A FIRE BEFORE IT STARTS!

To insure adequate protection against the hazards of fire, a qualified independent fire protection system is a must. And to be doubly sure of the best system, the vital heart of the unit, the pump, should be the best money can buy. That's where Peerless *fully-approved* fire pumps excel.

Throughout a third of a century, Peerless fire pumps have attained an enviable and pre-eminent reputation in protecting all types of buildings, plants and warehouses. Put this know-how to work on your protection problem. See how Peerless' combination of top quality fire pump equipment, exacting engineering application and nationwide service can serve you best. In many instances, the savings effected thru more favorable insurance premiums can pay for the installation. For fire pumps at their very best look to the leader, look to Peerless. Write for bulletin B-1500 today.

Available with steam turbine, engine or electric motor drives, Peerless fire pumps are available for high pressure sprinkler systems, or foam smothering systems in every kind of commercial, or industrial installation.

fmc FOOD MACHINERY AND CHEMICAL CORPORATION

Putting Ideas to Work

Peerless Pump Division

Plants:
Los Angeles 31, Calif. and Indianapolis 8, Ind.

PEERLESS PUMP DIVISION
FOOD MACHINERY & CHEMICAL CORPORATION
2005 NORTHWESTERN AVENUE, INDIANAPOLIS, INDIANA

Gentlemen: Please send me immediately a copy of your Bulletin B-1500.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

THERE'S A BETTER WAY... to protect tanks against corrosion; prevent material contamination!

You eliminate guesswork when you use Glidden protective coating systems. Reason: you get *real umbrella protection*—positive control of costly corrosion and material contamination, and at lowest maintenance cost!

VINYL-COTE and NU-PON COTE are two Glidden systems used extensively for protecting tank cars, storage tanks, pipelines, oil field equipment, chemical and industrial plants. Either can be used as a coating or lining system. Both offer excellent resistance to chemical fumes, general solvents, water, alkali conditions and abrasion. Both have been proven in laboratory tests and in field service.

As a part of Glidden Technical Service, one of our field engineers will make an on-the-job analysis to determine the correct protective coating system for your particular corrosion problem.

For *real umbrella protection,* get both—Glidden Technical Service *and* Glidden Maintenance Coatings. Write for details.

"THE GLIDDEN UMBRELLA"
of protection combines comprehensive technical service and tested formulations of maintenance coatings for all industry.

QUALITY Glidden PRODUCTS

COATINGS FOR EVERY PURPOSE

The Glidden Company
INDUSTRIAL PAINT DIVISION
900 Union Commerce Building
Cleveland 14, Ohio

lateral than for the 64-in. normal, which in turn was less than the 16-in. normal. Because the long lateral curve best indicates the formation resistivity at a distance from the well bore beyond the usual extent of filtrate invasion, it was used in estimating the uninvaded zone resistivity.

The resistivity indexes were determined from the potential curve, Micro-Log, and 19-ft. lateral reading. Resistivity indexes greater than 1 but less than 2 were found (see Fig. 6) between 4,700-50 ft.; at 5,750 ft. an index of slightly less than 6 was estimated. Sidewall core samples taken at 4,710 ft. contained oil, but a drill-stem test at this depth recovered only brackish water. Completed at 5,750 ft. in the high-resistivity index sand, the well flowed 266 bbl. of oil per day.

Example 2 . . . An example of the use of the resistivity index in interpreting focusing logs made in salty mud is illustrated in Fig. 7. In addition to the normal electric log, the focusing laterolog and microlaterolog are also shown. The unchanging character of the potential curve indicates that the salinity of the formation water was very nearly constant throughout the interval and that its salt concentration was approximately equal to that of the drilling fluid, a 17% salt mud. Examination of Equation 8 or Fig. 4 reveals that for this particular case the uninvaded and invaded zone resistivities should be identical for a completely water-saturated stratum. The resistivity curves of the electric log show little character in this section and fail to reflect the resistivities of the invaded and uninvaded zones. However, from the focusing-type logs the required information can be obtained. As can be seen in Fig. 7, a direct comparison of the log readings plainly indicates two hydrocarbon-bearing zones. In this example, the water-saturated zones gave the theoretical resistivity index of 1, which tends to verify the accuracy of the log readings.

References

1. Perkins, F. M., Jr., Brannon, H. R. Jr., and Winsauer, W. O., "Interrelation of Resistivity and Potential of Shaly Reservoir Rock," Trans. AIME, 1954, 201, 180.
2. Wyllie, M. R. J., and Southwick, P. F., "An Experimental Investigation of the S. P. and Resistivity Phenomena in Dirty Sands," Trans. AIME, 1954, 201, 43.
3. Poupon, A., Loy, M. E., and Tixier, M. P., "A Contribution to Electrical Log Interpretation in Shaly Sands," Trans. AIME, 1954, 201, 138.
4. Hill, H. J., and Milburn, J. D., "Effect of Clay and Water Salinity on Electrochemical Behavior of Reservoir Rocks," Trans. AIME, 1956, 207, 65.
5. Wyllie, M. R. J., "A Quantitative Analysis of the Electrochemical Component of the S.P. Curve," Trans. AIME, 1949, 186, 17.
6. Gondouin, M., Tixier, M. P., and Simard, G. L., "An Experimental Study on the Influence of Chemical Composition of Electrolytes on the S.P. Curve," Trans. AIME, 1957, 210, 58.
7. Doll, H. G., "The S.P. Log: Theoretical Analysis and Principles of Interpretation," Trans. AIME, 1949, 179, 146.
8. Harned, H. E., and Owen, B. B., "Physical Chemistry of Electrolytic Solutions, 55, Reinhold, 1950.
9. Rodnyanskii, I. M., and Galinker, I. S., Doklady Akad. Nuak, USSR, 1955, 105, 115.

Arkansas Gas Line Planned

A 230-MILE GAS line to cost $15 million will be built by Arkansas Louisiana Gas Co. and a new subsidiary from western Arkansas eastward across the state. The project will provide an industrial market for some 100,000 M.c.f. daily of gas from Arkansas Valley fields.

Arkansas Louisiana will build a 100-mile 16-in. line from the Aetna field area, west of Clarksville, to Perla. Arkansas Industrial Pipeline Corp. will build a 130-mile 18-in. line from there to Helena, on the Mississippi River. Arkansas Power & Light Co.'s new generating plant, scheduled to be completed early in 1961, will take more than half the volume.

The subsidiary was organized to take gas to industrial customers anywhere in the parent company's territory.

H-O-H*

GLUCOSATES*

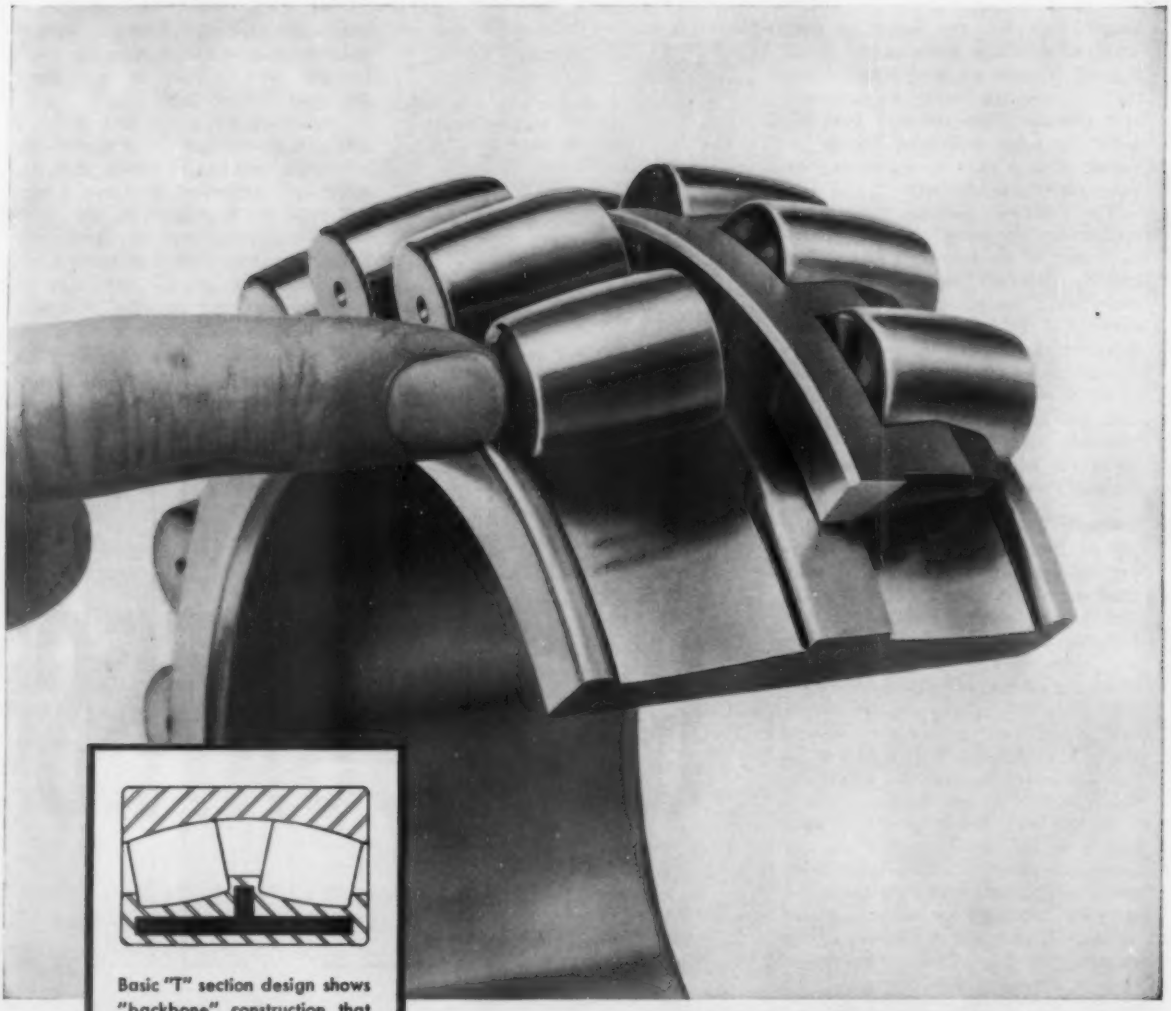
Improved Through Research
Proven By Performance
The Best For Your
Water Treating Problems

WE READ WATER* H-O-H ESTABLISHED 1931

Write for literature on your letterhead.

*REG. U.S. PAT. OFF.

D. W. HAERING & CO., INC.
ANALYSTS · CONSULTANTS · MANUFACTURERS
P. O. Box 10337
San Antonio 21, Texas



Basic "T" section design shows "backbone" construction that insures positive roller guidance and stability without skewing under all load conditions.

For roller stability...

there's nothing like "the bearing with the backbone"

The only *positive* way to guide rollers is by an integral center guide flange—backbone of the *Torrington* Spherical Roller Bearing. No floating ring can match it for stability under heavy radial and thrust loads.

This "bearing with the backbone" insures true rolling motion . . . prevents stress concentration . . . means minimum friction. It makes possible open-end cage design, too, with no shrouds to impede circulation of lubricant to bearing contact surfaces. There is less heating and more positive lubrication.

The integral center guide flange is adapted from the same principle used in the design of Torrington Tapered Roller Bearings. This refinement is typical of Torrington's uncompromising engineering that assures you the ultimate in bearing performance. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

Send for the new Torrington Roller Bearing Catalog #258

TORRINGTON BEARINGS

District Offices and Distributors in Principal Cities of United States and Canada

SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST

New servicing company will contract shallow, medium drilling

CONTRACT DRILLING of shallow and medium depth wells will be done by a newly formed oil-well servicing company at Jackson, Miss.

The company is the Oilwell Servicing Co., headed by Murray D. Stringer, as president, and Joe B. Sharp, as vice president and drilling superintendent.

It is starting with two trailer-mounted rigs, each capable of well-workover and servicing operations to depths of 14,500 ft., and well drilling to depths of 7,000 ft.

Yards and field office are at New Hebron, in Lawrence County. They will serve operations extending over the states of Mississippi, Louisiana, and Alabama.

Sharp, who will supervise all field operations, has had long experience in drilling. He was with Hewgley Drilling Co., Midland, Tex., 14 years, the last 6 as tool pusher. Since then he has been tool pusher for several contracting firms, including Lyle Cashion Co., Rex Drilling Co., and Kemp Drilling Co.

Drillers form partnership in Texas

TWO San Antonio men have formed a partnership to engage in contract drilling in Southwest Texas areas. They will operate as Dillon Drilling Co., starting with one rotary rig capable of drilling to 4,500 ft. Offices are in the Milam building.

Partners are Ed Dillon and Arthur Pryor. Dillon formerly was associated with Howell & Pegg, independent operators, and with Security Drilling Co. He was tool pusher for the latter firm.

Pryor came to the partnership from the oil division of Bowman Cattle Co., of San Antonio. Previously, he had worked for Core Laboratories, Inc., on the Gulf Coast, and Frank Bryant, Shreveport, La., operator.

Oil-law symposium set for New Orleans

The third symposium cosponsored by the American Association of Oil-well Drilling Contractors and Tulane University School of Law on "Legal Problems in the Tidelands" is scheduled for next Friday and Saturday (November 21 and 22) in the St. Charles Hotel, New Orleans.

The program features congressional studies of offshore oil operations; the federal-state interim agreement; federal and state laws on leasing, drilling and production; personal-injury procedures; liability insurance; international law developments; and Latin American laws and recent developments affecting offshore operations.

Who's getting the drilling contracts

A. W. Williams Drilling Co., Mobile, Ala., has two new contract operations in Clarke County, eastern Mississippi. One is a 6,000-ft. lower Tuscaloosa test for Eastland Drilling Co. and Hugh A. Grant at a wildcat location 4 miles southwest of Pachuta, in the southwestern corner of the county. The other is a 3,900-ft. Eutaw test for Broadhead & Stack at a wildcat location 18 miles east in the southeastern part of the county.

Woolf & McGee, Inc., Tyler, Tex., has contracts for two 8,750-ft. wildcat tests to be drilled for K. B. Keary, Jr., and P. J. Gay, of Vidalia, La., in northern Avoyelles Parish, Louisiana. One, at 1 Snowden-Elder, in 30-3n-6e, is about 4 miles east of Twisty Bayou field. The other, 1 Roy Martin, is 3 miles northeast in 14-3n-6e.

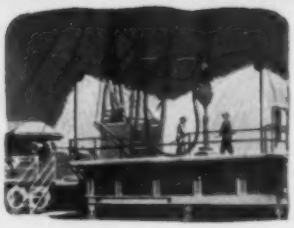
Bullard Drilling Co., Houston, has taken on a 16,500-ft. drilling job for Austral Oil Co. in the South Thornwell area of southern Jefferson Davis Parish, Coastal Louisiana. Its location at 1 Potter, in 33-11s-4w, is a mile northeast of production. Nearest well is a gas-condensate producer drilled by Pan American Petroleum Corp.

Penrod Drilling Co., Dallas, will drill L. O. McMillan's projected 10,500-ft. wildcat test in southeastern Beauregard Parish, Louisiana Gulf Coast. Its location, 1 Richard, in 32-7s-83, is 6 miles southwest of Fulton field, and about 5 miles from the Calcasieu Parish line.

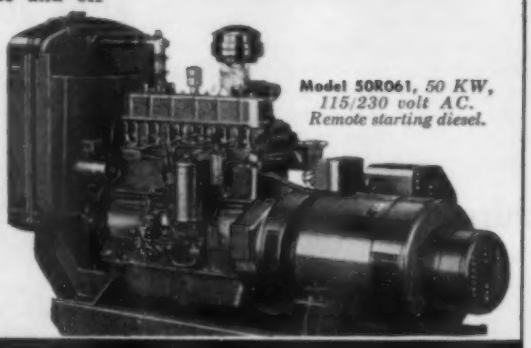
Lowe Drilling Co., Midland, Tex., has a new deep drilling job going for Pure Oil Co. in the South Vacuum

KOHLER ELECTRIC PLANTS

Complete line for sole supply and stand-by



Reliable power for rig lights, floodlights and maintenance tools on stationary, portable and off-shore rigs. Also for lighting, galley equipment, on quarter boats, personnel boats, tugs, barges. Automatic stand-by plants for refineries, tank farms . . . Sizes from 500 watts to 100 KW, gasoline . . . 10 KW to 100 KW, diesel. Write for folder C-7.



Model 5OR061, *50 KW, 115/230 volt A.C. Remote starting diesel.*

KOHLER CO.
Established 1873
KOHLER, WIS.

KOHLER OF KOHLER

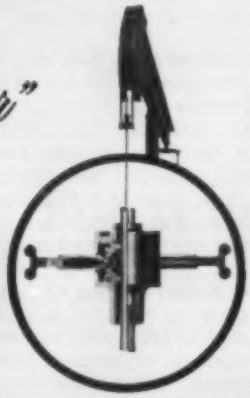
Enameled Iron and Vitreous China Plumbing Fixtures • Brass Fittings
Electric Plants • Air-cooled Engines • Precision Controls

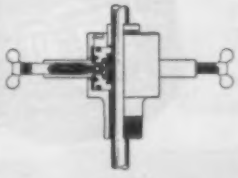
NOW...

"Maximum freedom from wear"

FOR EVERY PUMPING WELL

with **KINZBACH** "Type 241" Polished Rod Stuffing Box





Compensating for off-vertical movement of the polished rod, gland moves in same direction as rod, and maintains relative alignment with rod. Rod bears only against wear bushing at top of box.

Maximum freedom from wear of rod and tubing, and consequent longer life, is assured by the new, improved Kinzbach "Type 241" polished rod stuffing box with full-floating action.

Free to move laterally to compensate for any "off center" stroke of the rod, the floating gland is packed with a self-lubricated plastic packing. It may be tightened, and additional packing may be added at any time, without shutting down the well. Most wear is taken on the inexpensive, easily replaceable wear bushing.

KINZBACH TOOL CO. INC.

EXPORT: 74 TRINITY PLACE, NEW YORK, N. Y.

KINZBACH TOOL CO., INC.
P. O. Box 277 • HOUSTON, TEXAS

area, 16 miles west of Hobbs, in Lea County, southeastern New Mexico. It is Pure's 3-35 South Vacuum Unit, in 35-18s-35e. Drilling is to depths of 13,900 ft.

Chiles Drilling Co., Alice, Tex., is getting under way on a deep-drilling job in northeastern Live Oak County, South Texas. Contract calls for a 9,000-ft. test. Operator is W. L. Pickens, of Dallas,, whose location is about 13 miles northeast of Three Rivers, near the Bee County line. The test, a wildcat, is listed as 1 Meyer. Spot location is in the H. Casinova Survey.

Power Rig Drilling Co., Lafayette, La., is keeping three rigs busy in the rapidly developing Bonnet Carre field, in St. John the Baptist Parish, southeastern Louisiana, for F. A. Callery and The Texas Co., joint operators in the field. The field, opened last February, now has five completed oil wells and three others being completed. Production is from two 9,000-ft. zones. Location is near the western shore of Lake Ponchartrain, between it and the Mississippi River.

Inca Drilling Co. is moving a rig to the West Juanita area, in Beauregard Parish, southwestern Louisiana, where it will drill an 8,500-ft. exploratory test for Beck Oil Co. Location, 1 Lutcher-Moore, is a half mile west of the field's discovery well, drilled in 1955 by the former Houston Oil Co. The latter well was oil-productive in a 7,600-ft. sand. Only one other test, a dry hole, has been drilled.

Southland Drilling Co., San Antonio, is contractor on another test Crown Central Petroleum Corp. is starting on its prospect 4 miles north of Placedo, in Victoria County, Central Texas coast. It is Crown Central's second test in the area. The first, 400 ft. northwest on the same lease (West)), was drilled last year, and now is standing as "temporarily abandoned" with total depth of 7,356 ft. The new operation is projected to 8,200 ft.

Fred Wilson Drilling Co. has another contract coming up in the West Addis area, on the Iberville-West Baton Rouge Parish line, southeastern Louisiana where it is drilling for Aluminum Co. of America. It will be this contractor's fourth job in this field. The field, a year old this month, is oil-productive from a 11,200-ft. sand. **Glasscock - Wilson, Inc.,** has drilled three wells in the field for the above operator.

B and W

Scratchers and Centralizers for a Good Cement Job

Pioneers in the Improvement of Primary Cementing

In the drilling of oil wells, mud cakes are formed on the permeable formations. Cement slurry will bond with the formations only when the mud cakes have been "scratched off" the wall of the hole.

B and W originated and pioneered LATCH-ON CENTRALIZERS for easy installation . . . the KON-KAVE Bow for greater centering strength . . . the WALL CLEANING GUIDE . . . the MULTI-FLEX and HINGED NU-COIL SCRATCHERS FOR POSITIVE MUD REMOVAL AND COMPLETE CEMENT FILL.

The combination of (1) B and W Scratchers, (2) B and W Centralizers, and (3) Movement of the Casing as the cement slurry is placed—is

YOUR BEST INSURANCE FOR A GOOD CEMENT JOB

B and W Multi-Flex Scratcher. Easiest on the Hole.
B and W Solid Automatic Stop Collar Eliminates Welding on Casing.
B and W Hinged Automatic Stop Collar for Usage on External Upset Casing.
B and W Rotating Scratcher—Multi-Flex Type. Sturdiest for Cementing Casing and Open Hole Plugs.
B and W Wall Cleaning Guide. The Original Scratcher.
B and W Hinged-Nu-Coil Scratcher. Most Economical — Easiest to Install.
B and W Combination Unit. No Welding—Maximum Scratcher Travel.
B and W Latch-On Centralizer. Strongest Kon-Kave Bows.

FOR CATALOGS and DESCRIPTIVE FOLDERS ON ALL B and W PRODUCTS, WRITE

B and W Incorporated

WELL COMPLETION SPECIALISTS

GULF COAST: Box 5266, Houston 12, Texas, Phone WAlnut 3-6603

WEST COAST: 19706 S. Normandie Ave, Torrance, California, Phone FAculty 1-2463

103

PACIFIC NORTHWEST 30" PIPELINE JOB, BIG PINEY, WYOMING
SEPTEMBER, 1958

PIPELINING

How Westcoast crossed the rivers

PIPELINE CROSSINGS of rivers present major engineering and construction problems. On the Westcoast line there were crossings varying in width from a few feet to a maximum of 1,675 ft.

The long-span crossings were over the Peace River at Taylor, B. C., (1,675-ft. clear-span), Fraser River at Flood, B. C., (1,460-ft. clear-span), and over the Fraser River near Agassiz, B. C. The short spans were across the Fraser River near Shelley, B. C., (1,200-ft. clear-span) and 500-ft. spans across the Quesnel and Thompson rivers. Tenders were subsequently called for on a design-and-build basis. The Agassiz crossing of the Fraser River was eliminated when permission was secured to carry the pipeline on the new highway bridge at this location.

Specifications covering the design and construction of these six overhead crossings were prepared for Canadian Bechtel, Ltd., consultants to the owners, by R. M. Hardy & Associates, Ltd., acting jointly with Structural Engineering Services, Ltd., in cooperation with Bechtel Corp.

A joint venture including Marine Pipeline & Dredging Co., Ltd., B. C. Bridge & Dredging Co., Ltd., and Iriquois Constructors, Ltd., was successful in tendering on the design, fabrication, and construction of the three major crossings with R. M. Hardy & Associates, Ltd., and Structural Engineering Services, Ltd., providing the engineering advice. This joint venture was awarded the contract to place the pipeline on the new highway bridge at Agassiz.

Crossing Problems

The Peace crossing originally scheduled for one 30-in. and one 24-in. gas line (one to bring gas to the compressor station on the north bank from the Alberta field and one to distribution) was later changed to two 26-in. gas lines plus two 4-in. oil lines. With the collapse of the Taylor Flats highway bridge these two small oil lines were pressed into service ahead of schedule to transport oil across Peace River.

The Fraser crossing remained one 30-in. diameter pipe with loaded backstays over the CPR on the north side to give approximately 1,800 ft. of pipe supported by the crossing.

At the time of bidding structural steel was very scarce and fabricating space impossible to obtain in any of the major steel plants across Canada. Since the time schedule would not permit gambling, a source of structural pipe was located.

Design

A new design was needed which required a good deal of ingenuity since the two crossings were major structures. It was decided that towers would be constructed with pipe clusters for each of the two main load-carrying legs with space-frame bracing for stability. The tower, stable under the action of dead load only, had prestressed lateral guys designed to remove most of the horizontal wind shears from the tower legs.

Since the pipelines themselves are too slender for dynamic stability, lateral prestressed wind catenaries were employed. The major variation from standard practice here was that the end of the wind catenaries were carried directly to the ground rather than to horizontal arms at the towers.

Also from previous experience Canadian Bechtel, Ltd., required a diagonal, prestressed damping system in the plane of the hanger cables. This system has been successful in damping the vibrations in the vertical plane which have occurred in similar structures in the U. S. A.

As a basic concept of design it was decided that no field welding would be permitted. Flange plates were therefore shop-welded to all main-leg splice points, and the flange plates were faced in a large lathe. Weld neck flanges were welded to all bracing members and two 40-ft. sections set up in a jig, tack-welded and match-marked. One 40 ft. section was then disassembled and welded while a second 40-ft. section was placed. Thus one 40-ft. section in the jig had previously been matched before adding another.

Erection

The towers, trucked to the job in pieces, were erected and connected by high-tensile bolts. Minor erection difficulties were due primarily to steel workers who were accustomed to dealing with gusset plates which could be reamed for field fit. Flange-faced pipe can be fitted only by shimming or facing; members too long cannot be forced into place.

These are the only known successful attempts to use pipe exclusively for the towers of a major suspension crossing. The space-frame towers were analyzed and the critical buckling load of the tower as a whole is more than five times the design capacity of the inidividual members.

Each tower in the Fraser No. 2 crossing contains approximately 65 tons of structural pipe as does the north tower at the Peace. The south tower at the Peace crossing contains approximately 85 tons of structural pipe.

The first pipe was placed on the Peace River crossing from both sides. Initially it was attempted to push the pipe all from the south side. Difficulties, due primarily to the flexibility of the ties between the saddles, caused a change in plans. The second pipe was easily placed from one end since the first pipe gave added stiffness and a water load introduced at the north end minimized deflections.

The Fraser No. 2 crossing at Flood required great care and patience to load the pipe from one side but the job was accomplished without undue difficulty.

About the crossings

Construction of the Westcoast Transmission Co., Ltd., gas line involved two exceptionally long river crossings.

Both were of the clear-span suspension type and are interesting because of their unusual design. One spans the Peace River, while the second spans the Fraser.

These are the only known major suspension crossings which use pipe exclusively in their supporting towers. The Peace River crossing has the longest clear span of its type in the British Commonwealth and is exceeded in length by only one other pipeline crossing in the world.

How to CONTROL and ALARM the TOWER LIGHTS of UNATTENDED Microwave and Communication Stations

PHOTO ELECTRIC PANEL
Automatically turns Tower Lights ON and OFF in accordance with FCC regulations
FLASHER PANEL - Automatically flashes Beacon Lamps — with balanced load provisions.
ALARM PANEL - Automatically provides signals indicating failure of any lamp, power or control.

Model LC 201
TOWER LIGHTING CONTROL UNIT
(for Two Light Levels)
Model LC 101 (for Single Light Level)
Model LC 301 (for Three Light Levels)
Models also available with separate Alarm Signal for each Beacon Lamp.
Write for descriptive Bulletins

HUGHEY & PHILLIPS, INC.
Manufacturers of
300MM Beacons, Obstruction Lights, Photo-Electric Controls, Beacon Flashers, Special Junction Boxes, Microwave Tower Light Control & Alarm Systems, Remote Lamp Failure Indicator Systems, and Complete Kits for: Tower Lighting, Sleetmelter Power & Control.
3200 NORTH SAN FERNANDO BLVD.
BURBANK, CALIF.

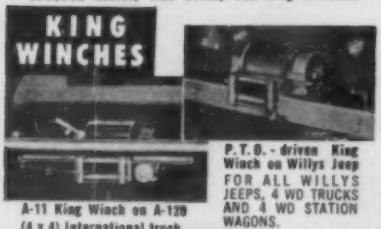
Servall ALL-STEEL SERVICE BODIES

FOR ALL
½-, ¾-, and
1-TON TRUCKS

Each body electrically welded into one unit with bed reinforced. Sturdy and economical . . . weatherproof compartments with recessed paddle-handle door locks.

Write for literature on service bodies, line-construction bodies, side boxes, and King Winches.

KING WINCHES



A-11 King Winch on A-120 (4 x 4) International truck.

There's a front-mount King Winch designed to fit your specific needs . . . for ½-ton through 2½-ton trucks . . . pulling capacities of 8,000 to 19,000 lbs.

P. T. O. - driven King Winch on Willys Jeep FOR ALL WILLYS JEEPS, 4 WD TRUCKS AND 4 WD STATION WAGONS.

Power-take-off-driven King Winch models 130J and 131J for CJ-3B and older-model Jeeps, can be transferred to CJ-5 and CJ-6 Jeeps . . . nothing extra needed.

King Winches for International trucks available through International dealers.

Koenig cabs and King Winches for Willys vehicles available through all Willys dealers.

Koenig IRON WORKS, INC.
P. O. BOX 7726, HOUSTON 7, TEXAS

On the Job

PIPELINING

New system gives surge protection

A NEW SURGE-CONTROL system now installed on several pipelines automatically protects the line and pump stations from destructive surges.

The system is an all-relay, self-checking type which is very simple in conception. Its operating principles have been applied in important signaling applications for several years. The system was developed by Union Switch & Signal—Division of Westinghouse Air Brake Co.

In normal operation the system continuously transmits, by carrier or direct current, a 120-pulse per minute code from the monitoring location to one or more upstream pumping stations. The circuitry is so arranged that any interruption to this code, such as power outage, loss of code, or carrier signal will result in visual and audible system-fault alarms. It will not cause station shutdown, however.

A 180-pulse per minute code operates continuously at the monitoring station but has no effect on the transmitter. This code, in conjunction with a reliable pressure-sensing device, constantly guards against line pressure surges. The operation of the 180 code is also checked continuously by relays and other circuitry.

When a line pressure surge occurs the pressure-sensing device activates the relay circuitry which permits the 180 code to key the transmitter, instead of the 120 code, although the 120 code continues to operate locally.

Upon receipt of the 180 code at the upstream station or stations, a contact of a code-following relay will operate to energize breaker-trip coils which will automatically initiate the shutdown of the upstream pump station.

When the surge ends, the circuit is automatically reset and is again ready to act against line surges. The 120 code again keys the transmitter, and the 180-code circuitry at the monitoring station continuously guards against line pressure surges.

When used for this system, the carrier circuit can easily be integrated into existing carrier facilities. This system provides a protected transmission facility for instantaneously transmitting pressure-surge information to upstream stations which will shut down pumps to prevent cracked pump cases or line blowouts.

A NEW Gaslite
INCORPORATING
THE MOST
ADVANCED FEATURES
AND DESIGNS
IN DECORATIVE
Outdoor Lighting

LOOK FOR THE NAME
Gaslite BY ARKLA
for information write:
ARKLA AIR CONDITIONING CORP.
SALES OFFICES: LITTLE ROCK, ARK.

STOP H_2S CORROSION BEFORE IT STARTS!

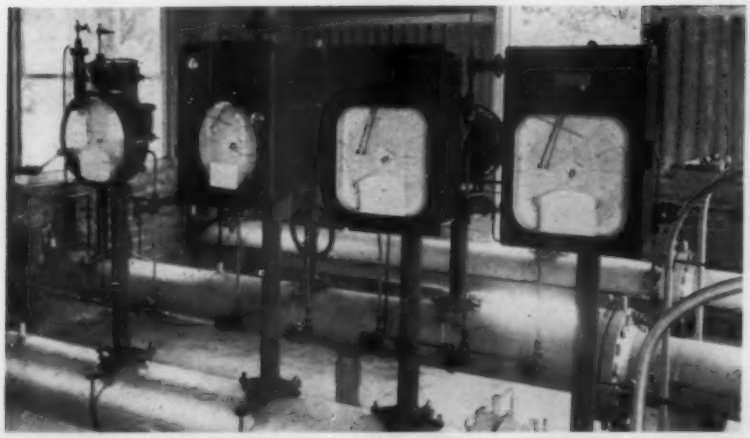
• The Connelly IRON SPONGE purification process at the well site removes hydrogen sulphide BEFORE the gas is piped to central processing. Thus, the cause of pipe line corrosion is eliminated because corrosive gas never enters the transmission lines. Additionally, Connelly IRON SPONGE eliminates the need for extreme close control. It operates with high efficiency at low or high pressures—absorbs more H_2S, gives longer service between foulings and is easily regenerated. If you have a purification problem check this MOST ECONOMICAL solution today. Write for Field Processing Bulletin #OG-7.

CONNELLY, Inc.
3164 SOUTH CALIFORNIA AVENUE
CHICAGO 8, ILLINOIS
ELIZABETH, NEW JERSEY

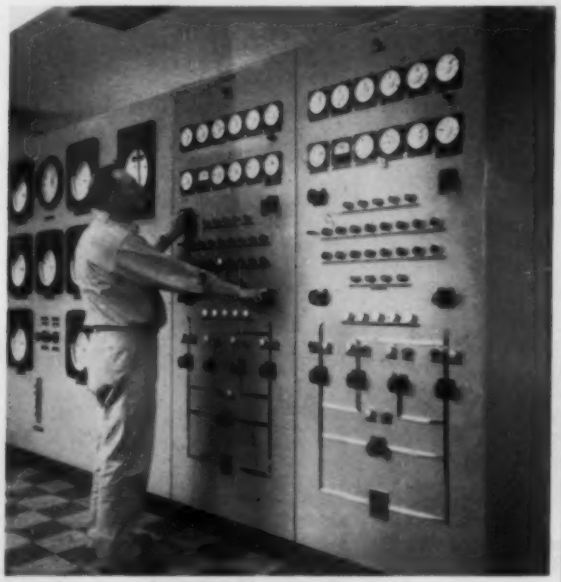
On the Job

PIPELINING

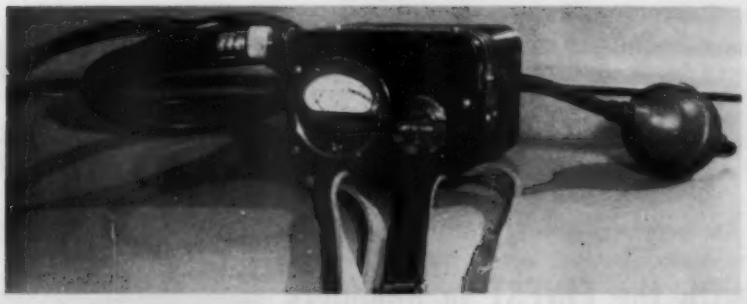
Northern adopts new ideas



DRY FLOW METERS are being tested at Northern Natural Gas Co., against meters using mercury "U" tubes, to prevent operation shutdown. Cold weather or high pressure sometimes cause freezing of liquids that might get into the mercury chambers.



THESE automatic controls enable one man to start a compressor engine from a remote position.



EXPLOSIMETER detects explosive gases in the air, and measures concentration. It also can be used to detect pipeline leaks.

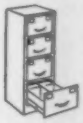
KRAFTBILT

OIL INDUSTRY FILING EQUIPMENT

STRIP LOG CABINET G-34, G-36

Each drawer of this sturdy, all-steel KRAFTBILT cabinet can hold 2,500 card-weight well logs filed on edge. No space is wasted because roller-bearing extension arms slide all the way out.

Built in 3-drawer sections with separate tops and bases to permit vertical stacking. Model G-36 files logs scaled to 6,000 feet (up to 65" long).



Electric Log Cabinet E-24

Vertical Rollfile V-96

Filing Supplies to fit perfectly are available for all KRAFTBILT units.

WRITE for Catalog 57-B on Kraftbilt

ROSS-MARTIN COMPANY

P. O. BOX 800 TULSA 1, OKLA.

'RUSS MASTER' SAYS...

RUSTMASTER

the sure RUST BUSTER

1. PRIME with Rustmaster, proved by laboratory comparison tests to be the best rust inhibitor!

2. FINISH with one of General's specialized industrial coatings.

RUSTMASTER SYSTEM

Write for specifications.

GENERAL PAINT COMPANY

Tulsa and San Francisco

Here's year-in, year-out Spudder Performance that Satisfies!

This Bucyrus-Erie 48-L spudder was purchased in 1952 by Charles E. Hipp, Graham, Texas. It is shown on a well in southern Oklahoma, drilling a top-to-bottom well. At the time this picture was made it was drilling 18-in. hole, which was in December, 1957.

This 48-L spudder is working on a 9,200-ft. well in the West Texas field. It is cleaning out and plugging back, also handling 5½-in. casing.

Ask repeat owner Charles E. Hipp, Graham, Texas

This veteran drilling contractor has long been a satisfied Bucyrus-Erie customer. He bought his initial Bucyrus-Erie spudder back in 1940 — one of the first 36-Ls built and the *first* Bucyrus-Erie spudder ever brought into the Lone Star State.

Since then, Hipp has standardized on Bucyrus-Eries. Through the years, he has purchased 13 rigs. His fleet now includes four 36-Ls and four 48-Ls, each mounted on tandem axles. Each is equipped with a 2-way radio.

With branch offices in Midland and Gainesville, Hipp keeps his spudders working 24 hours a day on oil wells in a widespread area between Oklahoma and New Mexico. Typical of his far-flung operations, one of his spudders traveled from Ardmore, Okla., to Kamay, Texas (105 miles), then to Lamesa (231 miles), to Seminole (42 miles), then into Eunice, N.M. (52 miles), and back to Kamay (311 miles) — drilling a well at each location.

Pleased with the mobility of his spudders, Hipp also appreciates their quick rig-up, tear-down advantages. In easily reached locations, his crews tear down and load out in less than three hours; in tough locations, it takes four hours.

You, too, can take profitable advantage of Bucyrus-Erie mobility and portability. Investigate the many reasons why these spudders are popular favorites among drillers everywhere for dependable performance. Write today for Bulletin No. OWD-Line-1. Better yet, visit your nearby distributor soon.

39538

BUCYRUS ERIE

FIRST with the FINEST in Spudders

BUCYRUS-ERIE COMPANY • DRILL DIVISION, BOX 324, RICHMOND, INDIANA

Third New Platformer for Gulf...

COLUMNS BY

GRAVER®

The third of three new 26,000 b/d Platforming® units to be installed by the Gulf Oil Corporation is now on stream at Gulf's Port Arthur refinery. Built under license from the Universal Oil Products Company, this latest installation will substantially increase the high octane potential at the refinery.

The five large columns above and two separator units were shop-fabricated at Graver's East Chicago plant and erected by Procon Incorporated, the general contractor. Eighteen columns for the other two Platforming unit installations at Gulf's Philadelphia refinery were also shop-fabricated at Graver's East Chicago plant.

Large or small processing equipment for petroleum, petrochemical, chemical and nuclear energy installations are produced with dispatch and skill by Graver artisans. Graver's century of experience means quality construction.

GRAVER TANK & MFG. CO., INC. EAST CHICAGO, IND.

PLANTS AND OFFICES ACROSS AMERICA

NEW! AiResearch split-flapper check valve

The new AiResearch Split-Flapper Check Valve provides an exceptionally clean flow of any gas or liquid through the valve area. It achieves very fast closure with no leakage in the return flow.

This extremely compact, lightweight unit has important applications in petroleum, chemicals, paint, food processing, missile fuels . . . any industry with a gas or liquid flow problem. The valve can be made from various materials, covering an operational temperature range from cryogenic levels to 1700° F.

The AiResearch Split-Flapper Check Valve pictured above is made of aluminum . . . rugged and dependable with only two moving parts. Twin forged flappers, opening in the direction of normal flow, are supported through the center of the piping. In the event of backward flow, their spring mounting and aerodynamic design assure fast closure of the valve.

Insertion of short flapper plates through the bore eliminates exterior bonnet and gasket joint and reduces length. Other structural advantages are better support of the plates, greatly reduced shock loads on the hinges and sealing surfaces, reduced springload, less mass and material to be heated or cooled by the flow element.

Ideal for portable as well as stationary applications, the new AiResearch Split-Flapper Check Valve can accommodate lines 1 to 12 inches in diameter. AiResearch has 17 years of experience in the production of valves and controls.

Your inquiries are invited.

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

Forged Steel. Shot Blasted. All Phoenix flanges meet full A.S.A. specifications — carbon steel and alloy.

Spot faced bolting surfaces, extra fine facings, accurate threading and a protective coating are typical of Phoenix quality.

Precisely machined welding bevel.

Special facings, bores, drilling, threading and special machining available.

The long life and precision workmanship you have a right to expect in the flanges you buy are assured when you order Phoenix forged steel flanges. You simply can't buy a better flange! It costs no more for Phoenix quality and *service*. That's why it's always worthwhile discussing your pipe flange requirements with the Phoenix representative.

A serrated gasket surface finish is standard on all Phoenix flanges with raised facings.

Write for handy 36 page pocket-size reference booklet containing useful data on flanges. It's FREE!

Leading Manufacturers of Pipe and Tank Flanges and Commercial Forgings

PHOENIX

FLANGE AND FORGING DIVISION

PHOENIX MANUFACTURING COMPANY

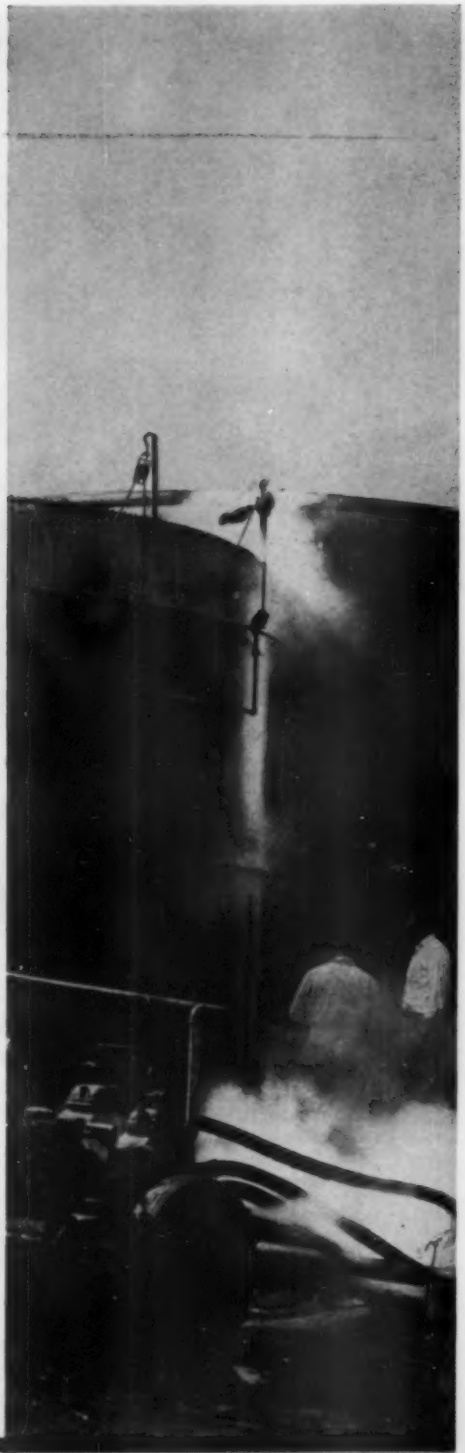
DIVISION — UNION TANK CAR COMPANY

CATASAUQUA, PA. • JOLIET, ILL. • FOUNDED 1882

PHOENIX DIVISIONS: FLANGE AND FORGING DIVISION, STEEL MILL DIVISION, HORSESHOE PRODUCTS DIVISION, FABRICATING REBAR DIVISION

Oakite ECP
engineered cleaning program

helps two-man crew strip tank bare in matter of hours



Rust-spotted, oil-splotched and peeling, an oil storage tank cried out for repainting. But stripping the old paint and soil had previously taken many tedious—and costly—man-hours of wire brush work. When refinery called in the Oakite engineer, he drew up an ECP, including a recommendation to strip tanks by the Oakite Hot Flow-On method. A heated solution of Oakite Stripper M-3 was flowed onto the tank surface through a perforated pipe "rake," recovered in a canvas trough, and recirculated. In just a few hours a painting team had moved in and the two-man stripping crew was ready to tackle another unsightly tank.

WHAT IS OAKITE ECP? It's an *Engineered Cleaning Program* that stresses chemical cleaning. It's engineered specifically for your refinery, for your cleaning problems, and for each cleaning operation—tower by tower, valve by valve.

The Oakite engineer lends personal and experienced supervision to each phase of the program. He supplies detailed instruction based on practical knowledge of refinery cleaning needs. Each Oakite ECP is backed by a *laboratory* concentrating on chemical cleaning research, by *materials* known to make short work of refinery soils, by proved *methods*. Send for booklets. Oakite Products, Inc., 50B Rector Street, New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE
SCIENCE

Export Division Cable Address. Oakite

Technical Service Representatives in Principal Cities of U. S. and Canada

In our 50th year.

Oakite ECP
your economy key

A dozen vessels built by Newport News were furnished under contract with C. F. Braun, Inc., of Alhambra, Calif., design engineers for the ultra-modern Delaware Flying A Refinery of the Tidewater Oil Company located 15 miles south of Wilmington.

Newport News builds 12 major components for new Flying A 130,000-bpd refinery

This is the Tidewater Delaware Flying A Refinery while under construction near Wilmington.

Newport News fabricated 12 of its major vessels — 2 of which are the largest such units ever built: a 250′ Orthoflow fluid "cat cracker" converter and a 225′ reactor scrubber of the fluid coker.

More notable than size, though, is the quality of the Newport News fabrication.

Coke-out screens in the reactor scrubber, for example, are made of 704 12% chromium segments. Welded together with accuracy, they provide 45% clear opening . . . with opening tolerances less than 1%.

You get expert fabrication, the skill of specialists when Newport News builds your equipment. When you want reactors, pressure vessels, vacuum tanks and the like, sub assemblies or weldments in almost any size or shape, get a bid from Newport News.

Send for newly published, easy-to-read, illustrated booklet, "Facilities and Products". It describes the many ways in which Newport News can help you with present or future projects. Write for your copy today.

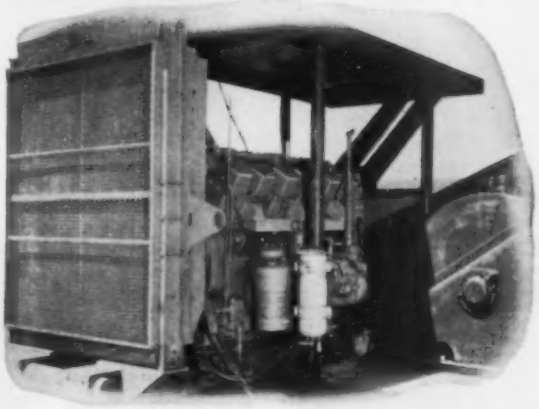
Full advantage was taken of the Newport News deep water loading facilities for transportation of all of the equipment by barge. Shop erection prior to shipment assured fast, trouble-free field assembly.

Engineers: Desirable positions available at Newport News for Designers and Engineers in many categories. Address inquiries to Employment Manager.

Newport News Shipbuilding and Dry Dock Company, Newport News, Virginia

WHEN YOU BUY CLIMAX...

You Buy Years of Money Saving Service



Climax V-125 Natural Gas Engine operating on an oil rig near Houston, Tex.

CLIMAX GAS, GASOLINE or BUTANE ENGINES—for drilling rig, compressor and pump service, 6 cylinder to V-12, 40 to 605 hp. (max.) at 1200 rpm.

ASK ANY CLIMAX OWNER:

1. How his conservatively rated engine matches *all* the requirements of his job...supplies plenty of reserve power when needed...and just keeps on working year after year, paying for itself in minimum attention, trouble-free operation and low fuel cost.

2. About the operational simplicity of his engine... the handy location of controls and accessories ...convenient accessibility to working parts ...and the many other long-standing features that have made Climax famous for easy routine maintenance.

3. About distributor service—how his Waukesha-Climax Distributor has saved him time, trouble and money...first, by recommending just the right model for the job...second, by insuring proper installation...and third, by keeping in close personal touch with 24-hour service, skilled mechanics and factory parts.

Your Waukesha-Climax Distributor will be glad to tell you about Climax owners in your area. Ask him for names and facts...also for recommendations on the particular Climax Engine that will give *you* years of money saving service.

OIL FIELD DISTRIBUTORS

WAUKESHA SALES AND SERVICE, INC.
Texas: Houston, Wichita Falls, Corpus Christi, Odessa, Kilgore, Dallas, Pampa, Abilene, Midland, San Juan, San Antonio
Louisiana: New Iberia, Shreveport
New Mexico: Hobbs

KANSAS ENGINE & MACHINERY CO., INC.
Kansas: Great Bend, Wichita

WERME SUPPLY COMPANY
Oklahoma: Oklahoma City

OIL WELL SUPPLY COMPANY
West Virginia: Charleston

SOUTHERN COACH PARTS, INC
Alabama: Birmingham

HOPEMAN EQUIPMENT COMPANY
Oklahoma: Seminole, Duncan

REAGAN EQUIPMENT CO.
Louisiana: New Orleans
Mississippi: Natchez

WAUKESHA ENGINE AND EQUIP. CO.
Colorado: Denver
Wyoming: Casper
North Dakota: Williston
New Mexico: Farmington
Montana: Great Falls

THE LOVE COMPANY
Utah: Salt Lake City, Blanding

OIL FIELD MOTOR SERVICE CO.
Illinois: Grayville

WAUKESHA SOUTHERN CALIFORNIA
California: Los Angeles, Castaic, Bakersfield, Taft, Ventura, Santa Maria, Long Beach, Avenal

R. ANGUS (ALBERTA) LTD.
Canada: Edmonton (Alb.), Estevan (Sask.)

MASSE EQUIPMENT CO.
Canada: Montreal (Quebec)

KIPP KELLY, LTD.
Canada: Winnipeg (Manitoba)

CLIMAX ENGINE MANUFACTURING CO.
• DIVISION OF WAUKESHA MOTOR COMPANY •
FACTORY—CLINTON, IOWA

Shielding your plant from fire

. . . through skilled engineering

of AER-O-FOAM systems

Developments in the *engineering* of fire-fighting foam systems have made foam constantly more efficient . . . and economical . . . in control of fire in flammable liquids.

National Foam, time and again, has pioneered these developments. Through improvements in mobile systems, for example, National Foam has substantially reduced installation costs in modern foam systems.

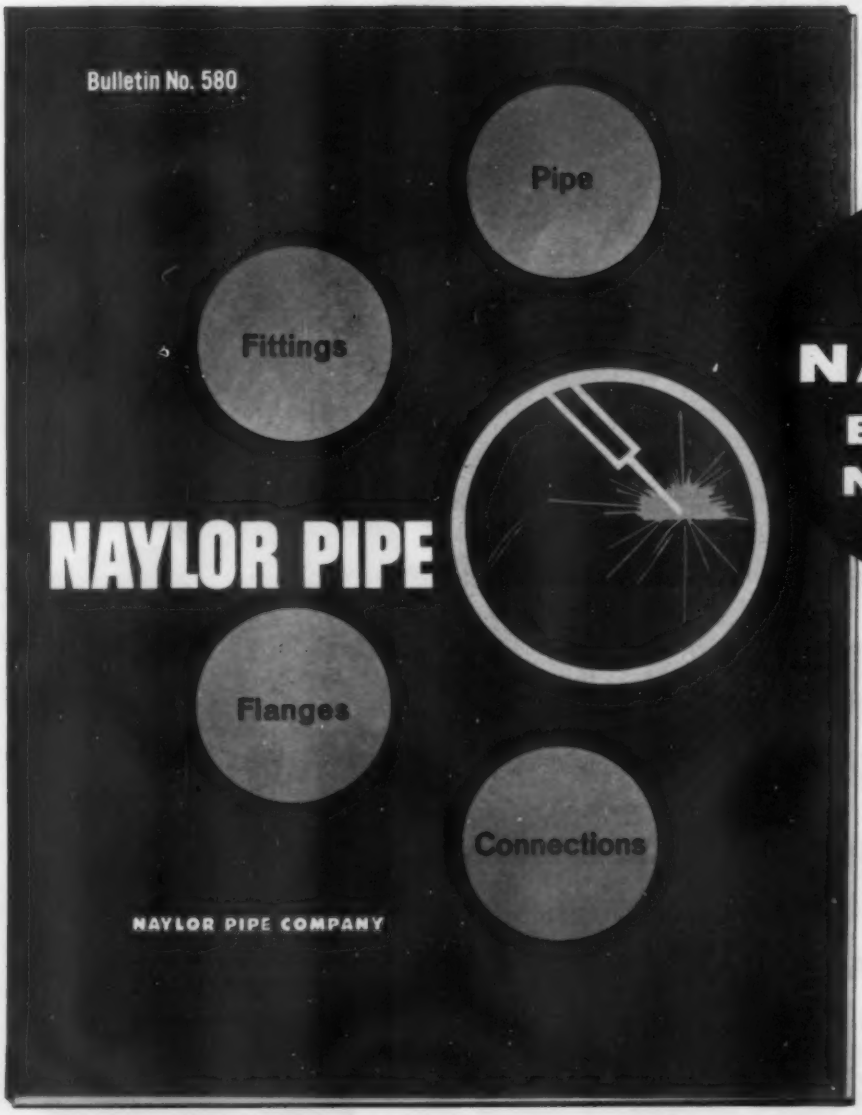
Safety engineers know they will get the benefit of up-to-the-minute system design when they call in the National Foam representative.

New efficiency in control of fire *is planned in this section of National Foam's engineering department.*

NATIONAL FOAM System, Inc.

West Chester, Pa.

Helps ANSWER Your PIPE PROBLEMS



Write for **NAYLOR Bulletin No. 580**

Here in concise form is helpful data covering NAYLOR pipe, fittings and connections for use in oil field applications. Bulletin No. 580 includes standard specifications on NAYLOR Spiralweld pipe in sizes from 4" to 30"; standard fittings and welding flanges carried in stock; NAYLOR Wedgelock couplings and all types of connections to meet pipe line needs. Write for your copy today.

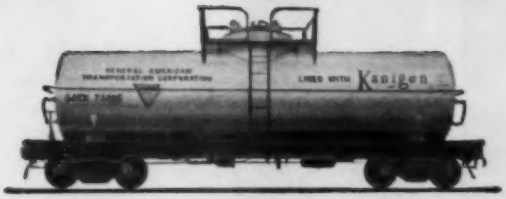
NAYLOR PIPE Company

1232 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.

EXCLUSIVE DISTRIBUTORS IN MID-CONTINENT AND GULF COAST AREAS: **MID-CONTINENT SUPPLY CO.** • Fort Worth, Texas and Branches

THE TANK CAR NEWS OF 1958



GATX cars lined with Kanigen®... new nickel-alloy coating

KANIGEN, a unique patented process, deposits a hard, uniform, corrosion-resistant nickel-alloy coating on tank car interiors . . . lasts four to six times as long as phenolic, epoxy or neoprene linings. You can load at high temperatures that would destroy other linings. For example, 73% caustic soda can be piped in at unlimited temperatures.

Tank cars lined with KANIGEN are also being successfully used for liquids such as tetraethyl lead, ethylene oxide and glucose.

If your product is a liquid, GATX furnishes or can build a tank car to transport it. GATX maintains a nation-wide network of shops for servicing.

No capital investment . . . when you ship GATX.

KANIGEN is a trademark which identifies chemical nickel coating by GENERAL AMERICAN TRANSPORTATION CORPORATION and its licensees, the product resulting therefrom and compositions produced by them for use in chemical nickel coatings.

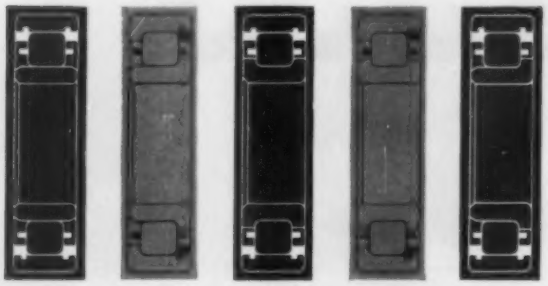
GATX GENERAL AMERICAN TRADE MARK

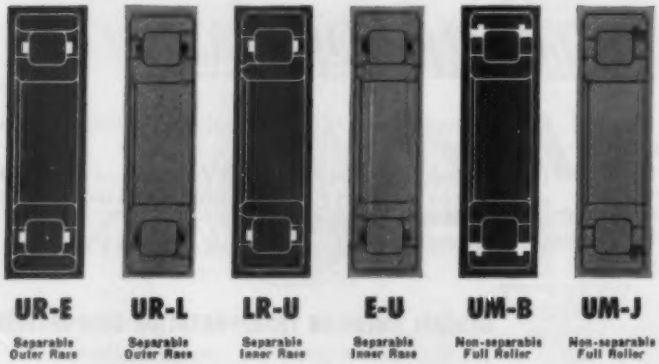
GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street • Chicago 90, Illinois

Offices in all principal cities

The Type UR-E Tru-Rol segmented-retainer bearing illustrated above, affords adequate precision, performance and life expectancy for most "upper range" commercial-grade applications.

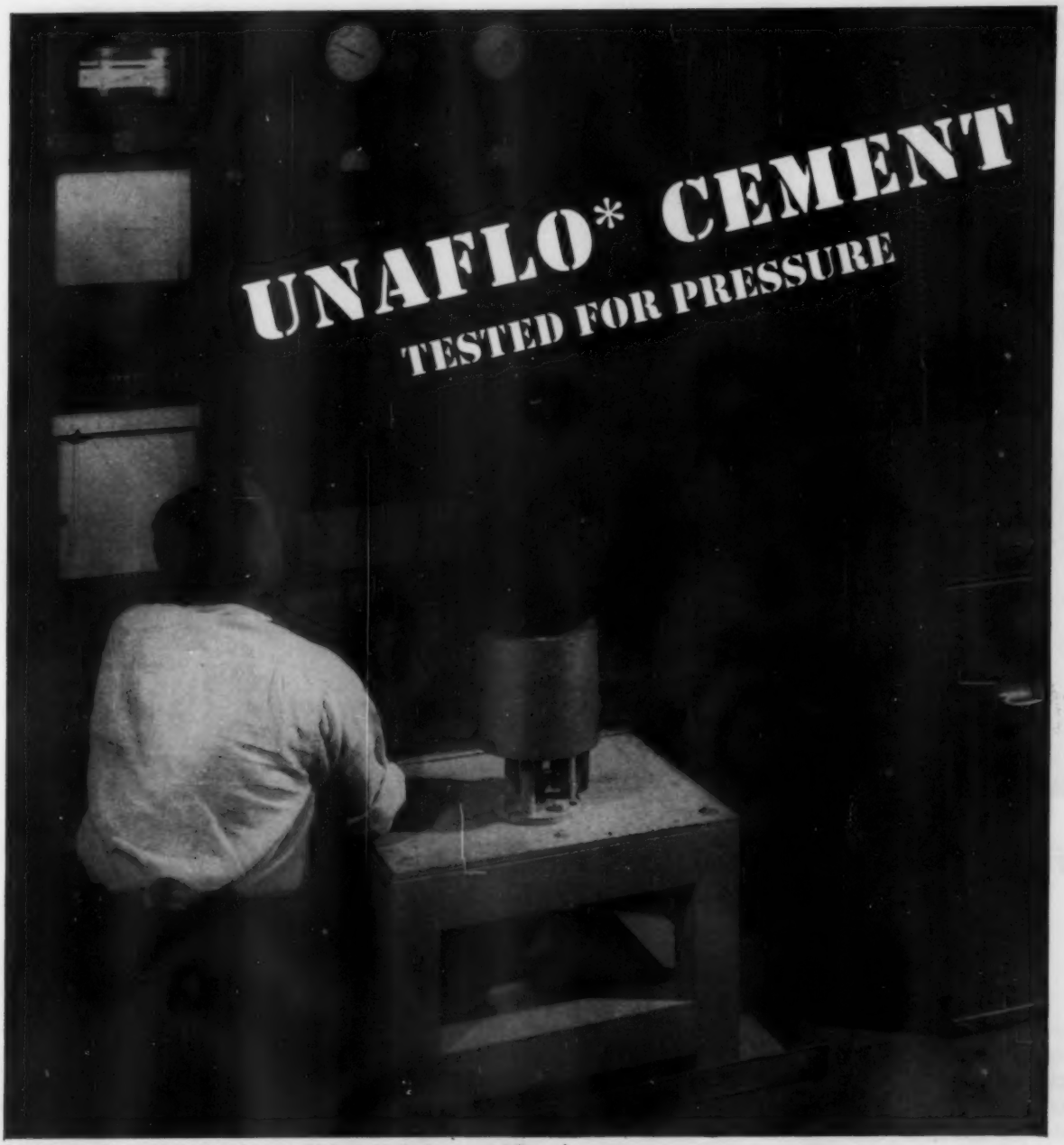




Rollway Tru-Rol Bearings give you "for the job" selectivity in a wide range of applications. They approach the design, precision and quality of bronze-retainer bearings as closely as commercial grade pricing will allow. Internal clearances are close. Rollers are equally spaced to avoid out-of-balance vibration and "pulse". And each is crowned to distribute the load evenly along the full length of the roller. 11 types available in single and double width bearings, in stamped steel retainer, segmented retainer or full roller construction.

ask a near-by Rollway Service Engineer to detail the quality you should be getting in your "commercial grade" bearings. No cost. No obligation. Write to

ROLLWAY BEARING COMPANY, INC.
586 Seymour St., Syracuse, N.Y.
ENGINEERING OFFICES: Syracuse • Philadelphia
Boston • Chicago • Cleveland • Pittsburgh
Detroit • Seattle • Houston • Los Angeles
San Francisco • Toronto



Apparatus used to cure cement specimens used in heat of hydration, permeability and absorption tests. Pressure vessel in foreground simulates these well conditions: temperatures from 80° F. to 400° F. and pressures from atmospheric to 10,000 psi.

- Careful attention to product testing of UNAFLO retarded oil-well cement pays off in down-the-well dependability.
- UNAFLO slurries pump easily, and stay pumpable under high bottom-hole temperatures and pressures, giving vital extra time in case of emergencies.
- After its retarded period, UNAFLO cement hardens normally to form a strong, well-bonded structure that is watertight and resistant to sulphate waters.

For typical data tables, write: Universal Atlas, 100 Park Avenue, New York 17, N. Y.

*UNAFLO is a registered trade-mark

U-158

UNIVERSAL ATLAS CEMENTS

Universal Atlas Cement Company

Subsidiary of **United States Steel**

USS

OFFICES: *Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco*

For better, longer-lasting protection—paint it with

Humble's protective coatings

In refineries and chemical plants where strong acids, alkalis and salt sprays produce severe corrosive conditions, Humble's protective coatings can save you hundreds of dollars in corrosion damage. Humble's protective coatings contain rust-preventing ingredients that not only provide surface protection, but also neutralize any corrosive substances that may get through the surface protection and attack the metal. And they give excellent resistance to weathering, plus good color and gloss retention.

Originally developed to protect Humble equipment, Humble's protective coatings have proved their value through years of extensive use, and are now marketed the world over. Included in Humble's complete line of protective coatings are RUST-BAN®, vinyls, epoxies, phenolics, enamels and others. These coatings are available in a wide range of finish colors.

Without cost or obligation, one of Humble's trained engineers will make a thorough study of your needs and recommend a complete painting program for you.

• *For detailed information on how Humble's protective coatings can save you money, call your Humble salesman, or phone or write:*

Humble Oil & Refining Company
Sales Technical Service
P. O. Box 2180
Houston 1, Texas

HUMBLE OIL & REFINING COMPANY HUMBLE

IBM offers you . . .

TEN PROVEN PROGRAMS

packaged for small refinery use with the IBM 650

IBM 650 Magnetic Drum Data Processing System

Powerful aid to small refineries

Ten customer-tested programs are now available without cost to small refinery users of the IBM 650 system. These packaged programs permit every refinery to obtain the advantages of electronic computing immediately.

Yours . . . five years of engineering programming effort

Due to the full cooperation of the petroleum industry, whose extensive experience at more than sixty IBM 650 installations has made these programs possible, you can now get five years of programming effort . . . packaged and ready for your use. For example:

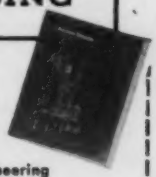
Magnolia's linear programming code

An adaptation of the modified simplex method is used to solve the linear programming model. The program will process problems having a maximum of thirty-four restraints, or row vectors, and an unlimited number of variables, or column vectors. Use is made of a combination of fixed and floating point routines to reach the desired solution. Output results are the basis variables and the shadow prices of the non-basis variables. Running time is difficult to estimate as it depends on the density of the model, as well as the number of rows and columns. A typical problem with thirty-four rows and fifty-seven columns, requiring thirty-four iterations, ran in one hour and forty minutes. Approximately two man-months were required for programming.

Booklet describes programs in package

SEND for the new booklet, "Proven Engineering Programs for Petroleum Refineries." Get detailed explanations of how all 10 of these powerful engineering programs can benefit your operations.

IBM **DATA PROCESSING**



PETROLEUM DEPARTMENT A58-d,
International Business Machines Corporation,
590 Madison Avenue, New York 22, New York

Please send me the free booklet, "Proven Engineering Programs for Petroleum Refineries."

Name_____

Position_____

Company_____

Address_____

City_____ State_____

Men like JOHN WACHUCK make the difference!

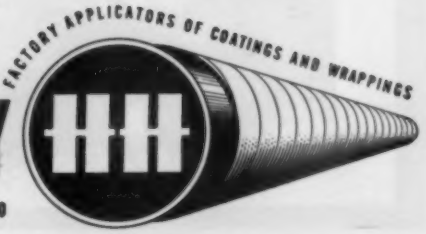
He conditions the pipe for coating! But, don't worry, John Wachuck knows exactly what his Roto-Grit blast machine can do. His fingertips control millions of tiny steel grits that "scrub" the pipe silver-bright so the coatings will bond perfectly! John, and the men who work with him, are your best guarantee of Hill-Hubbell craftmanship. Their skill assures you of consistent quality!

When pipe is coated and wrapped, it calls for the precision of factory-application and factory-control

Specify Hill-Hubbell wrapped pipe on your next job

HILL-HUBBELL & COMPANY

DIVISION OF GENERAL PAINT CORP. • 3091 MAYFIELD ROAD, CLEVELAND 18, OHIO



Orderly arrangements of supplies that are tailored to each area's needs make shopping easy in National Supply Stores.

An oil show—open here every day!

Remember the industry's last International Oil Exposition at Tulsa . . . all the new equipment and product information? The same kind of show on a smaller scale is evident every day in the 130 National Supply Stores that serve oil men in the United States, Canada and Venezuela.

All the important elements are there. For your ease and convenience in shopping, you'll find equipment and supplies in orderly, attractive arrangements. Don't let the front counter stop you—you're welcome to browse throughout the store and the equipment yard.

The store also provides plenty of product information, usually displayed in a handy rack "library" on or near the counter. By checking this, and talking with the National sales people, you can quickly learn what's new in equipment . . . and the field news of the area, too.

The purpose of all National Store displays and the information we give is the same as the Oil Exposition—to help you drill your hole or operate your wells more efficiently. National Supply has 70 years of experience behind this purpose that can help you every day. Shop us soon.

This National Type A Rotary is in action on a rig in Arkansas. Put a National Rig behind your "A" Rotary and you have a combination that really means good drilling business!

New National Type A Rotaries are easy to install, operate and maintain!

The rotary design you've wanted is here—fully field-tested and as modern as any major drilling equipment available today. Look at these outstanding features of National Type A Rotaries:

Rectangular housing and guard—Simplifies installation in the derrick substructure and permits rig flooring to be flush-fitted to table top for cleaner, safer working areas.

Cartridge type pinion shaft assembly—Removable as a unit, this provides a single housing with a stronger and more rigid base. *Permanent bearing alignment* is assured, as well as easier maintenance, less adjustment and less vibration.

Unitized gear table assembly—Main and hold-down bearings are unitized with the table and this permits complete bearing adjustment before installation of the table assembly in the housing. The assembly is subsequently removable with all bearings intact, in working positions, *without disturbing adjustment*.

The rectangular housing and guard for National Type A Rotaries simplifies installation in the derrick substructure and permits rig flooring to be flush-fitted to table top for cleaner, safer working areas.

A National Type SA-175 Rotary ready for delivery with other derrick equipment from National's Torrance, California plant. The Type SA-175 has a 17½" table opening with 44" spacing. Other models are the LA-175—17½" opening with 53⅛" spacing—and the A-205—20½" opening with 53¼" spacing.

Direct table locks—Locking pawls, to prevent table rotation either direction as desired, are applied to recesses or notches on the table perimeter. This totally eliminates excessive strain and shock loading on the pinion shaft, and the need for a lock ring on the shaft.

Accessibility and operation—Lock pawl handles, oil filler pipe, dip stick and lifting trunnions are all accessible at the top of the guard for easiest operation and maintenance. Rotary is easily sling-handled for convenient installation, inspection, maintenance and removal.

Oil bath lubrication throughout—Type A Rotaries have positively induced oil circulation for the pinion and gear, table bearing and pinion shaft bearings. No grease fittings are used, because grease lubrication is entirely eliminated.

In addition to these special features, National Type A Rotaries have the construction benefits long associated with all National Rotaries—perfectly matched spiral bevel gears, proven main bearings, improved pinion shaft assemblies and wide, non-skid tread tops. Add all the features and you have all the good reasons why you buy wisely when you choose a National Type A Rotary. New models are available in the popular 17½" and 20½" sizes. See them soon.

National Rigs and their ratings on the next page!

This National Type 55 Rig is rated at 700 input horsepower and is designed for drilling from 6,000 to 9,000 feet.

There's a National Rig for every drilling need!

You've heard for years—and if you've operated one, you know—how National Rigs have extra performance stamina built-in. Even under adverse conditions, they perform smoothly and last long.

Decades of field experience and performance record studies have produced this unchallenged conclusion: *National Rigs are designed to operate with maximum dependability at their horsepower and depth ratings.*

You can see by the ratings on this page that there's a National Rig to suit every possible drilling need.

In addition to the equipment leadership reputation they reflect, you're apt to find these performance ratings—like many of our customers do—definite assets in contract negotiations. If you have never owned or operated a National Rig, there are many good reasons for taking a second look. Ask the National representative in your area soon.

Type	Input Horsepower Rating	Depth Rating
8	120	1,000 to 2,000
12	200	1,500 to 3,000
20	300	2,000 to 4,000
32	400	3,000 to 5,500
45	550	4,500 to 7,500
55	700	6,000 to 9,000
80-B	1,000	8,000 to 12,000
110	1,375	11,000 to 16,000
130	1,625	13,000 to 20,000
1320	1,625	13,000 to 20,000
1625	2,500	16,000 to 25,000

THE **NATIONAL SUPPLY** COMPANY

MAIN OFFICE: Two Gateway Center, Pittsburgh 22, Pa.
DIVISION OFFICES: Dallas; Denver; Houston; Toledo; Tulsa; Torrance
CANADA: The National Supply Company, Ltd., 200 F. W. Clark Building, 709 Eighth Avenue, West, Calgary, Alberta
EXPORT: 600 Fifth Avenue, New York 20, N.Y., U.S.A.; City Wall House, Chiswell Street, London E. C. 1

NATIONAL BLUE OIL FIELD MACHINERY AND EQUIPMENT
SPANG STEEL PIPE AND ELECTRICAL CONDUIT

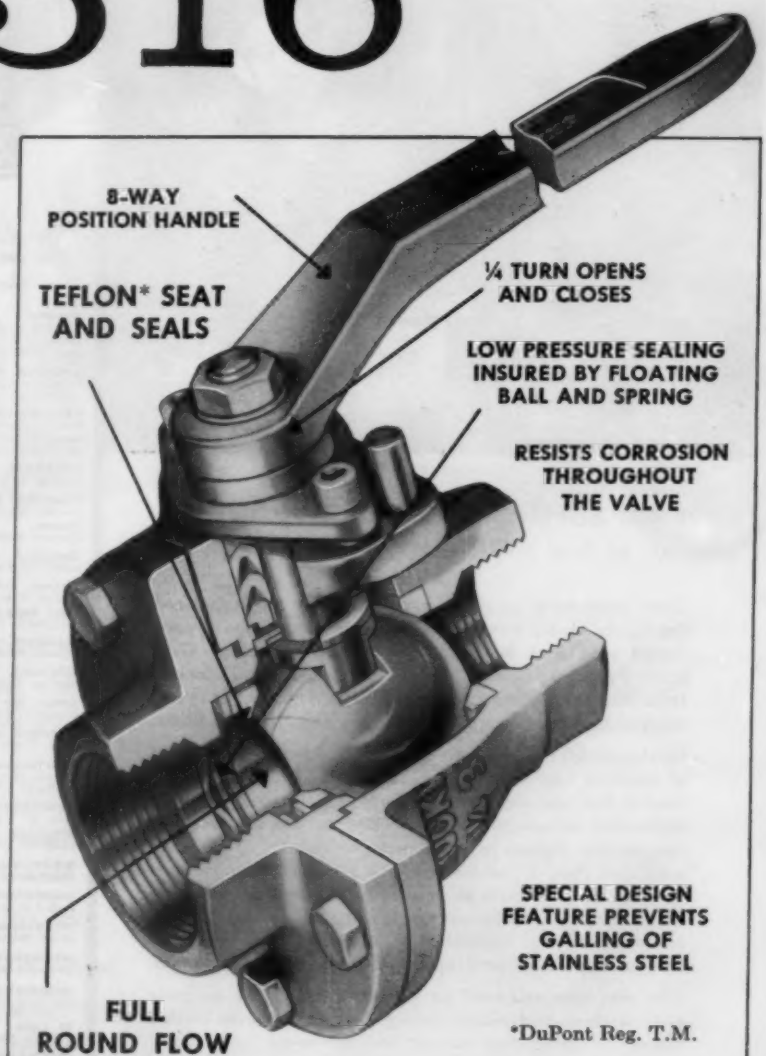
Now you can get the famous advantages of ROCKWOOD Ball Valves—*IN STAINLESS STEEL*—

"316"

Rockwood's new "316" Ball Valve gives you positive sealing over a wide range of pressures. A simple design utilizing a Teflon ball seat and spring assures you of low pressure sealing (spring behind ball forces ball against the seat) and high pressure sealing (pressure supplements spring for pressure-tight seal). Friction loss and turbulence are also greatly reduced because of the "316's" straight full round flow passage. Features like these have made Rockwood the most dependable name in Ball Valves.

The new Rockwood "316" comes with various types of seats, remote air-operation of wanted sizes, ⅜" through 2" screwed ends, 3", 4", 6" and 8" flanged ends. 600 W.O.G. minus 100°F to 400°F. And it's just one of a complete line of Rockwood Valves and Unions.

Write for Rockwood's new catalog — the inside story of Rockwood Ball Valves is worth knowing. Tested and listed by Underwriters' Laboratories, Inc. Distributors in all principal industrial areas.


8-WAY POSITION HANDLE
TEFLON* SEAT AND SEALS
¼ TURN OPENS AND CLOSES
LOW PRESSURE SEALING INSURED BY FLOATING BALL AND SPRING
RESISTS CORROSION THROUGHOUT THE VALVE
SPECIAL DESIGN FEATURE PREVENTS GALLING OF STAINLESS STEEL
FULL ROUND FLOW

*DuPont Reg. T.M.

ROCKWOOD BALL VALVES

ROCKWOOD SPRINKLER COMPANY
1045 Harlow Street, Worcester 5, Massachusetts

Send me your new Rockwood Full-Flow Ball Valves Catalog No. 57.

Name.....*Title*.....

Company.....

City.....*Zone*....*State*.....

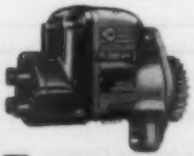
Everywhere your equipment goes there is FAIRBANKS-MORSE Service

you get SUPER SPARK magneto parts in a hurry, at low FAIRBANKS-MORSE prices!

Your equipment is never very far from an authorized Fairbanks-Morse service station, added assurance of continued sure and easy SUPER SPARK starting. Over 3,200 Fairbanks-Morse service dealers . . . well stocked from 65 central distributors . . . provide fast, expert maintenance that keeps your engines in top operating condition.

Fairbanks-Morse magneto repair kits, for a wide variety of gasoline engines, save you money and provide longer trouble-free performance. Available off-the-shelf at every authorized service station, these kits include all the parts you should replace in a magneto overhaul . . . *at lower total cost than if you bought each part individually.* Replacing all vital parts at once reduces maintenance shutdown time . . . makes possible dependable, profitable operation of your equipment. Complete kits are available to speed repair of every type of SUPER SPARK magneto.

The next time you need an engine tune-up, look for your nearest time- and money-saving Fairbanks-Morse service dealer . . . *you'll find one not very far away.*



More than 4,000,000 magnetos in use.

FAIRBANKS-MORSE

A name worth remembering when you want the BEST

MAGNETOS • ELECTRIC and REWIND STARTERS • WATER SYSTEMS • PUMPS
GENERATING SETS • MOTORS • SCALES • DIESEL LOCOMOTIVES and ENGINES

Fairbanks-Morse MAGNETOS

SALES SERVICE

You can depend on these 65 central distributors and more than 3,200 service dealers

ALABAMA, Birmingham
Birmingham Electric Battery Co.
Montgomery
Parts Service Co., Inc.

ARIZONA, Phoenix
"Charlie" C. Jones Battery & Elec. Co.

CALIFORNIA, Los Angeles
Magneto Sales & Service Co., Inc.
San Francisco
H. G. Makelim Company

COLORADO, Denver
Central Auto Electric Company

FLORIDA, Jacksonville
Spencer Electric, Inc.
Tampa
Spencer Auto Electric, Inc.

GEORGIA, Atlanta
Auto Electric & Magneto Co.

IDAHO, Boise
Oakley Wholesale
Idaho Falls
Simpson's, Inc.

ILLINOIS, Chicago
Illinois Auto Electric Co.

INDIANA, Indianapolis
Gulling Auto Electric, Inc.

IOWA, Des Moines
Electrical Sales & Service Co.

KANSAS, Wichita
E. S. Cowie Electric Co.

KENTUCKY, Louisville
Central Service & Sales Div. of Kentucky Ignition Company

LOUISIANA, New Orleans
John M. Walton, Inc.
Shreveport
Magneto Ignition Service Co.

MARYLAND, Baltimore
Parks & Hull Automotive Corp.

MASSACHUSETTS, Boston
A & J Auto Ignition Company

MICHIGAN, Detroit
Knorr-Maynard, Inc.

MINNESOTA, Minneapolis
Reinhard Brothers Co., Inc.

MISSOURI, Kansas City
Electrical & Magneto Service Co., Inc.
St. Louis
Electric Parts & Service Co.

MONTANA, Billings
Original Equipment Company

NEBRASKA, Omaha
Carl A. Anderson, Inc.

NEW JERSEY, Fair Lawn
Fairbanks, Morse & Co. Export Division
Newark
Tire Trading Company

NEW YORK, Albany
Roemer & Zeller
Bolivar
Bolivar Magneto Co.
Buffalo
Hettrich Electric Service
New York City
Coretti-Gross, Inc.
Pelham Manor
Coretti-Gross, Inc.
Syracuse
F. A. Crossman, Inc.
Utica
Stiefvater Electric Co., Inc.

NORTH CAROLINA, Raleigh
A. M. Tyner Co.

OHIO, Cleveland
Nook & O'Neill, Inc.
Marietta
Marietta Ignition Co.
Toledo
Electric Power Maintenance Co.

OKLAHOMA, Oklahoma City
American Electric-Ignition Co.
Tulsa
Magneto Ignition Co., Inc.

OREGON, Portland
Automotive Products, Inc.

PENNA., Philadelphia
Motor Ignition Company
Pittsburgh
Automotive Ignition Company
Scranton
Scranton Auto Ignition Co.

RHODE ISLAND, Providence
A. & J. Auto Ignition Company

SOUTH CAROLINA, Columbia
Magneto & Electric Service, Inc.
Greenville
Battery & Electric Co.

TENNESSEE, Memphis
Automotive Electric Service Co., Inc.
Nashville
Automobile Electric Service Co.

TEXAS, El Paso
Reynolds Battery & Magneto Co.
Fort Worth
Generator Service Company (Div. Beard & Stone Elec. Co., Inc.)
Houston
Beard & Stone Electric Co., Inc.
Houston
Wahlberg-McCreary, Inc.
Kilgore
Magneto Sales & Service Co.
San Antonio
S. X. Callahan
Waco
Beard & Stone Electric Company

UTAH, Salt Lake City
Automotive Service Company

VIRGINIA, Richmond
Chas. H. Woodward Electric Co.

WASHINGTON, Seattle
Pacific Magneto Service
Spokane
Gill Automotive Company

WEST VIRGINIA, Bluefield
Groseclose Auto Electrical Service
Charleston
MacFadden Ignition Company
Clarksburg
White Electric Company

WISCONSIN, Milwaukee
Wisconsin Magneto Company

On the loading docks of your **supply store** gather the customer, supply house man, Baash-Ross sales engineer and the superior equipment that have aided the oil man in developing today's efficient drilling and production methods. An integral part of the American oil field system, your **supply store** strives to have conveniently at hand every item needed by any oil field worker for his job.

Working with your **supply store** are well trained, capable representatives of recognized manufacturers of quality oil tools such as Baash-Ross. These representatives add specialized local service on their particular equipment to the convenience of local stocking by the **supply store**. Together they provide you with the best equipment and service available to any industry in the world today.

So when you need slips, rotary bushings, safety clamps, spiders or other drilling and production equipment, call your nearby Baash-Ross representative and meet him at your convenient **supply store** for complete stocks and superior service.

NEW 1959 CATALOG NOW AVAILABLE! **Get your copy by writing to P. O. Box 1348, Houston 1, Texas.**

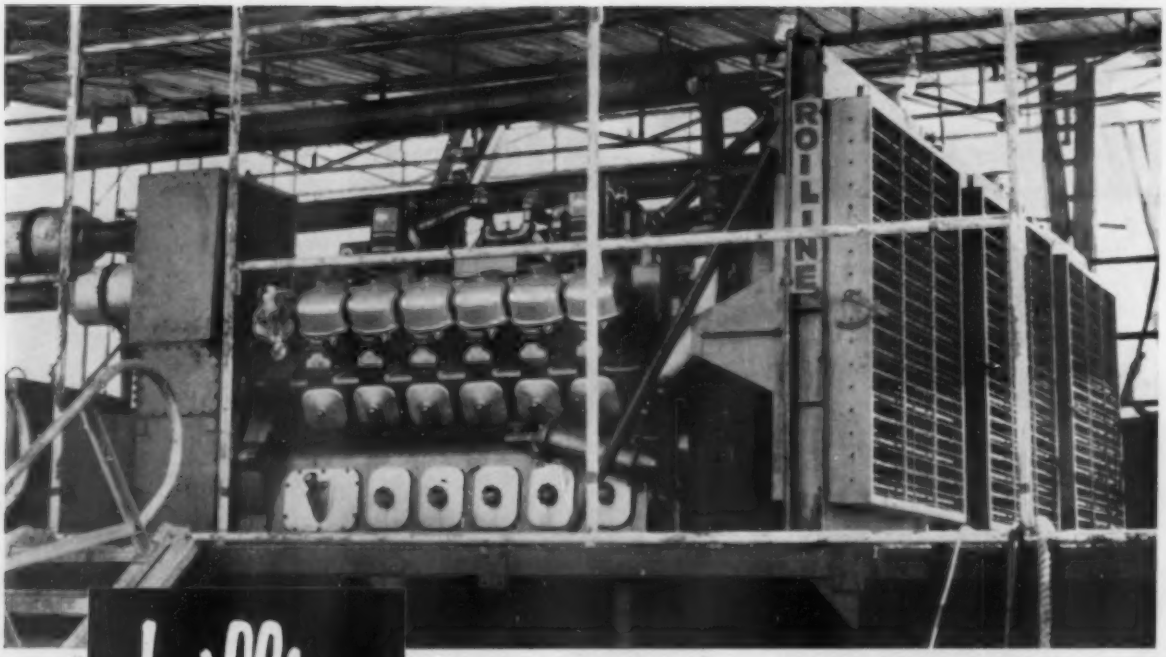
BAASH-ROSS DIVISION
OF JOY MANUFACTURING COMPANY

GENERAL OFFICES: 5306 CLINTON DRIVE, HOUSTON, TEXAS

AREA OFFICES:
HOUSTON, TEXAS, ODESSA, TEXAS, DALLAS, TEXAS; LONG BEACH, CAL.; CASPER, WYOMING; OKLAHOMA CITY, OKLA.; OLNEY, ILL.; CALGARY, ALBERTA CANADA; NEW YORK, N.Y. (EXPORT OFFICE)

FOREIGN OFFICES:
MONTE CARLO, MONACO; MEXICO CITY, MEXICO; GREENOCK, SCOTLAND; LONDON, ENGLAND; PARIS, FRANCE; CARACAS, VENEZUELA; BUENOS AIRES, ARGENTINA; RIO DE JANEIRO, BRAZIL; TEL AVIV, ISRAEL; TOKYO, JAPAN

BAASH-ROSS JOY



Falcon Seaboard Drilling Co. rig, in Grady County, Okla., is powered with three ROILINE Engines—Model L-3460—12-cylinder V-type, 7¼-in. bore x 7-in. stroke, 3468 cu. in. displ., counterbalanced crankshaft, operating on natural gas, up to 586 hp at 1350 rpm.

drilling speed and capacity with three ROILINE ENGINES

(formerly LE ROI)

• Deep drilling power . . . lots of it . . . and fast acceleration that saves time and speeds up drilling!

Because of their V-12 cylinder design, light pistons, short radius rotating parts, and sensitive controls these Model L-3460 ROILINE Engines pick up a load fast.

Hydraulic "Zero lash" valve lifters eliminate tappet noise and adjustments and extend valve life. That means smooth, quiet engine operation and easier maintenance.

Exhaust manifold is water-cooled and integrally cast into the crankcase to provide cooler operating area and fast engine warm-up.

"Easy Flow" manifold design provides perfect fuel and air distribution to all cylinders through large individual intake ports. This advanced design manifolding . . . low friction bearings . . . low power loss to accessories—all contribute to ROILINES' remarkable economy of operation.

Send for descriptive Bulletin E-7.

ARIZONA, Casa Grande, Engine Service Company
ARKANSAS, Paragould, Wonder State Manufacturing Co.
CALIFORNIA, Long Beach, Engine & Equipment Company
ILLINOIS, Centralia, John Nickell Company
KANSAS, Garden City, Carson Machine & Supply Co.
LOUISIANA, Shreveport, Ingersoll Corporation
MICHIGAN, Reed City, Hafer Engine Company
OHIO, Columbus 19, Cantwell Machinery Company
OKLAHOMA, Chickasha, Chickasha Gin & Mill Supplies
Oklahoma City 9, Carson Machine & Supply Co.
PENNSYLVANIA, Pittsburgh 34, P. C. McKenzie Company
TEXAS, Houston 1, Southern Engine & Pump Co.
Lubbock, Farmers Supply Company
Odessa, General Machine & Parts Co.
Wichita Falls, Nortex Engine & Equipment Co.
WYOMING, Casper, Emrick & Hill Engine & Equipt. Co.

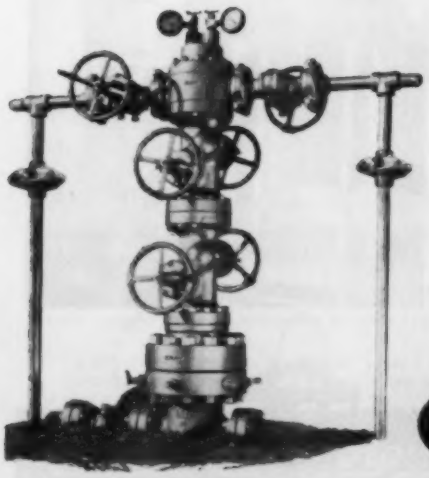
• *The trade mark LE ROI is used under license from Westinghouse Airbrake Co., the trade mark owner.* 402

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN / **New York • Tulsa • Los Angeles**
Factories at: Waukesha, Wisconsin and Clinton, Iowa

GRAY gives you... complete control

AT ALL POINTS

with complete safety



From casing head to pressure gauge, Gray Multiple Zone Well Head Assemblies are designed for one purpose: Complete control of *your* well.

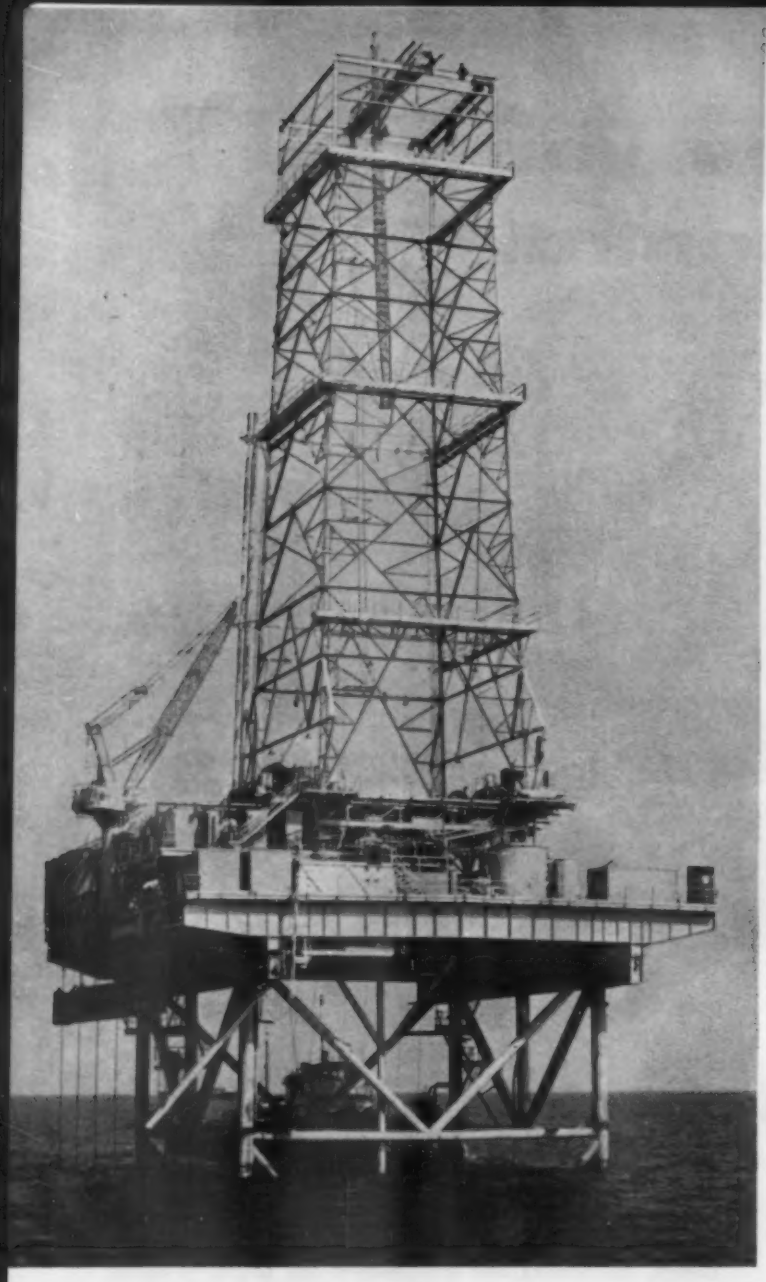
Design, engineering and construction are based on safety. That's why you get *more strength with less weight.* Through simplicity of design and maximum flexibility, the result is positive, efficient handling of every well control problem—single or multiple zone; high, medium or low pressure at *any* depth. Gray Well Control Systems . . . *complete control gives complete safety.*

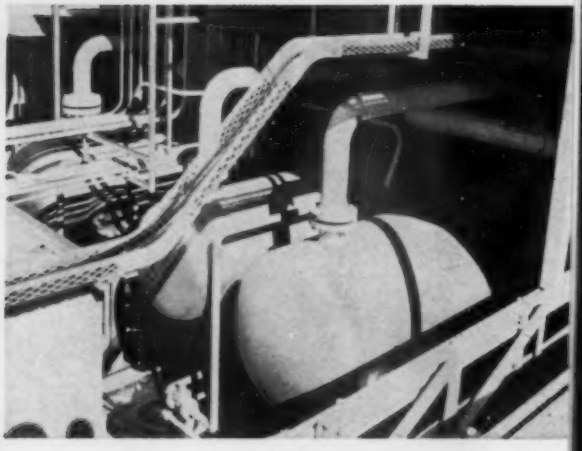
Learn more about Gray's Multiple Well Control Assemblies; see the Gray Catalog in Composite Catalog or write

G 5603

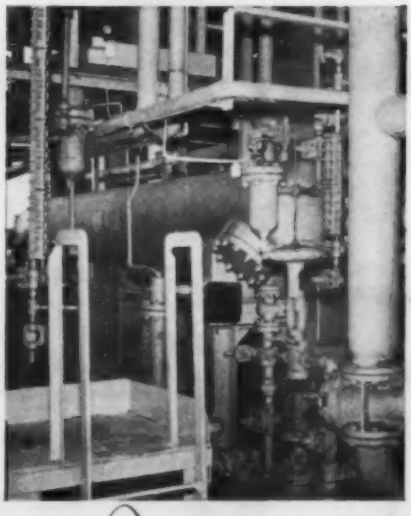
GRAY *Tool Company*

P. O. Box 2291 • HOUSTON 1, TEXAS





BS&B EQUIPMENT GOES TO SEA



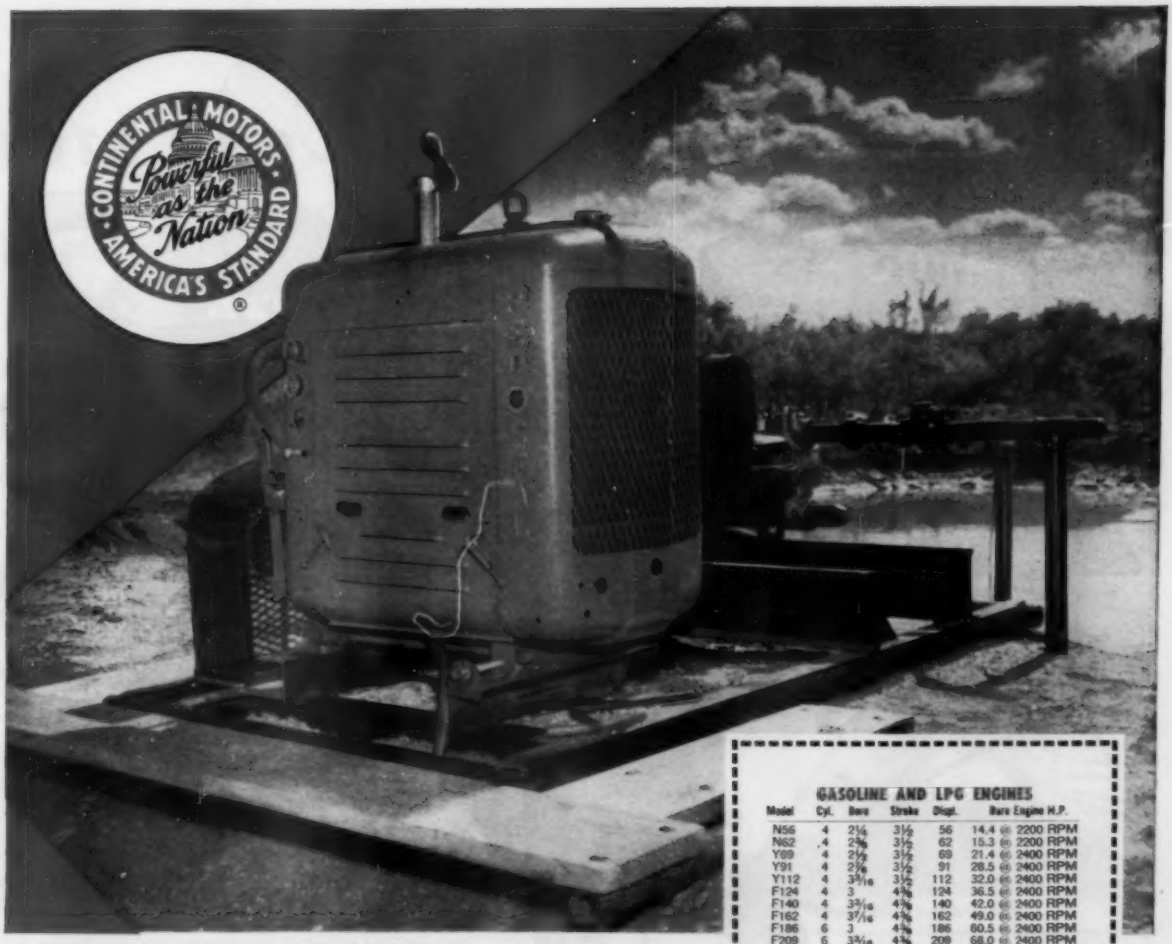
In 100-ft. deep water two miles offshore from Summerland stands California's first permanent-type drilling platform. Equipped with twin crown blocks, this 1,000-ton structure is capable of drilling two wells simultaneously, and will drill up to a total of 25 wells from its present location.

On an installation of this kind, space is at a premium. Aboard the platform the BS&B horizontal production separators with BS&B controls were specially designed to provide compactness, minimum maintenance, and heavy-duty service.

BS&B

ANOTHER EXAMPLE OF PRODUCT LEADERSHIP

BLACK, SIVALLS & BRYSON, INC., DEPT. 1-A11B P. O. BOX 1714, OKLAHOMA CITY



CONTINENTAL RED SEALS
Find Ready Acceptance in the Oil Fields

The ever-widening acceptance of Continental Red Seal engines in all types of oil field operations is attributed in great part to specialization—in Continental's long-standing policy of engineering each model precisely to the job to be done. Each and every model is the product of 56 years' engine-building experience. The industrial series comprises 57 different basic models—from 14 to 237 horsepower and they are backed by parts and service from coast to coast. Visit your nearest oil field supply store or write the factory for information.

6 EAST 45TH ST., NEW YORK 17, NEW YORK • 3817 S. SANTA FE AVE., LOS ANGELES 58, CALIF.
6238 CEDAR SPRINGS ROAD, DALLAS 9, TEXAS • 1252 OAKLEIGH DR., EAST POINT (ATLANTA) GA.

GASOLINE AND LPG ENGINES

Model	Cyl.	Bore	Stroke	Displ.	Bare Engine H.P.
N56	4	2 1/4	3 1/2	56	14.4 @ 2200 RPM
N62	4	2 3/8	3 1/2	62	15.3 @ 2200 RPM
Y69	4	2 1/2	3 1/2	69	21.4 @ 2400 RPM
Y91	4	2 3/8	3 1/2	91	28.5 @ 2400 RPM
Y112	4	2 9/16	3 1/2	112	32.0 @ 2400 RPM
F124	4	3	4 1/8	124	36.5 @ 2400 RPM
F140	4	3 1/16	4 1/8	140	42.0 @ 2400 RPM
F162	4	3 1/16	4 1/8	162	49.0 @ 2400 RPM
F186	6	3	4 1/8	186	60.5 @ 2400 RPM
F209	6	3 1/16	4 1/8	209	68.0 @ 2400 RPM
F226	6	3 1/16	4 1/8	226	73.0 @ 2400 RPM
F244	6	3 1/16	4 1/8	244	79.0 @ 2400 RPM
M271	6	3 1/8	4 1/8	271	86.2 @ 2400 RPM
M290	6	3 1/8	4 1/8	290	92.2 @ 2400 RPM
M330	6	4	4 1/8	330	104.4 @ 2400 RPM
M363	6	4	4 13/16	363	128.9 @ 2800 RPM
B371	6	4 1/8	4 1/8	371	110.0 @ 2400 RPM
B427	6	4 5/16	4 1/8	427	127.0 @ 2400 RPM
*Z129	4	3 1/4	3 1/8	129	35.0 @ 2000 RPM
*Z134	4	3 5/16	3 1/8	134	39.5 @ 2000 RPM
G134	4	3 1/4	4 1/8	134	35.0 @ 2000 RPM
G157	4	3 3/8	4 1/8	157	40.0 @ 2000 RPM
*G174	4	3 9/16	4 1/8	174	54.0 @ 2000 RPM
*G193	4	3 3/4	4 1/8	193	59.4 @ 2000 RPM
*E201	4	3 5/8	4 1/8	201	65.9 @ 2400 RPM
*E208	4	3 11/16	4 1/8	208	67.8 @ 2400 RPM
H227	4	3 5/8	5 1/2	227	54.0 @ 1800 RPM
H243	4	3 3/4	5 1/2	243	57.9 @ 1800 RPM
*H260	4	3 7/8	5 1/2	260	62.0 @ 1800 RPM
*H277	4	4	5 1/2	277	66.1 @ 1800 RPM
K363	6	4	4 13/16	363	123.0 @ 2400 RPM
*J382	4	4 1/2	6	382	74.0 @ 1400 RPM
*U403	4	4 5/8	6	403	110.0 @ 2000 RPM
T371	6	4 1/8	4 5/8	371	119.0 @ 2400 RPM
T427	6	4 5/16	4 7/8	427	140.0 @ 2400 RPM
U501	6	4 1/2	5 1/4	501	160.0 @ 2400 RPM
R513	6	4 1/2	5 5/8	513	164.3 @ 2400 RPM
R572	6	4 3/4	5 3/8	572	182.4 @ 2400 RPM
R602	6	4 7/8	5 5/8	602	191.7 @ 2400 RPM
V603	8	4 3/8	4 1/2	603	240.0 @ 2800 RPM
S749	6	5 3/8	5 1/2	749	217.0 @ 2200 RPM
S820	6	5 3/8	5 1/2	820	237.0 @ 2200 RPM

CUSHIONED POWER DIESEL ENGINES

Model	Cyl.	Bore	Stroke	Displ.	Bare Engine H.P.
*ZD129	4	3 1/4	3 1/8	129	34.0 @ 2000 RPM
GD157	4	3 3/8	4 1/8	157	39.0 @ 2000 RPM
*GD174	4	3 9/16	4 1/8	174	42.5 @ 2000 RPM
*GD193	4	3 3/4	4 1/8	193	55.5 @ 2200 RPM
*ED201	4	3 5/8	4 1/8	201	45.8 @ 2000 RPM
*ED208	4	3 11/16	4 1/8	208	61.5 @ 2200 RPM
HD243	4	3 3/4	5 1/2	243	68.9 @ 2200 RPM
*HD260	4	3 7/8	5 1/2	260	74.0 @ 2400 RPM
*HD277	4	4	5 1/2	277	79.0 @ 2400 RPM
*JD382	4	4 1/2	6	382	87.4 @ 2000 RPM
*UD403	4	4 5/8	6	403	91.5 @ 2000 RPM
TD427	6	4 5/16	4 1/8	427	132.0 @ 2200 RPM
RD572	6	4 3/4	5 3/8	572	154.0 @ 2000 RPM
VD603	8	4 3/8	4 1/2	603	197.0 @ 2600 RPM
SD802	6	5 9/16	5 1/2	802	202.0 @ 1800 RPM

*Available for industrial applications only.

Continental Motors Corporation
MUSKEGON • MICHIGAN

MACKS deserve the best in parts and service

For all its rugged stamina, your Mack is a precision machine. You can dull the edge of its remarkable efficiency with replacement parts that aren't engineered to Mack's matchless standards. Macks deserve the best—Genuine Mack Parts.

So insist on the premium performance you'll get with Mack Parts—designed or tested by Mack engineers and guaranteed to perform like the original units. Even better, in some cases, for Mack components are continually improved as new methods and materials are developed.

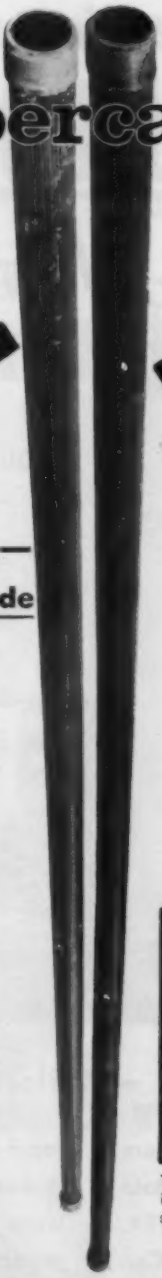
You operate the world's best trucks when you own Macks. Keep 'em that way with the world's best parts—*made by Mack . . . made for Macks.* Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

5646

MACK
first name for
TRUCKS

EVERYWHERE A MACK GOES . . . THERE ARE MACK PARTS . . . AND MACK SERVICE

BOTH ARE Fibercast® WELL TUBING



ONE IS NEW . . .

THE OTHER WAS IN A SALT WATER DISPOSAL WELL FOR 17 MONTHS!

You can't tell the difference — Because Fibercast will not corrode

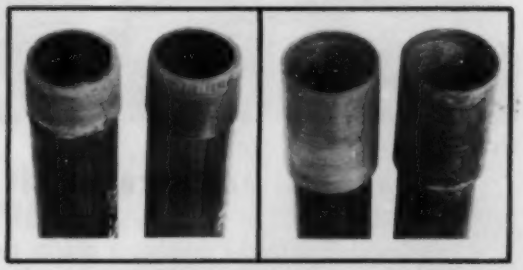
Anyone who has pulled a string of tubing after several months and found it corroded beyond practical use will truly be impressed with *this actual* experience. The length of Fibercast on the far right was in a salt water disposal well for 17 months . . . the one on the left is new. Yet, because Fibercast is unaffected by corrosion-causing elements, there is no noticeable — and, more important, *measurable* — difference. This is also true after 36 months!

Corrosion eats away dollars as well as the pipe; that is, most pipe . . . but not Fibercast, because Fibercast *will not corrode*. Too, Fibercast has many other greatly desired advantages including high operating temperatures and pressures . . . lightness . . . and long-term economy.

You get the same wanted qualities in Fibercast Line Pipe for gathering lines . . . tank hook-ups . . . all refinery and chemical plant installations where corrosion is a problem.

Send the coupon below for the new Fibercast Bulletin No. 20 and find out how you can save money through installing Fibercast.

All photos are unretouched



The tubing on the left above is new — the other was in a salt water well for 17 months.

There's no noticeable or measurable difference between the new coupling on the left and the one that was in salt water for 17 months!

FIBERCAST COMPANY
A DIVISION OF THE YOUNGSTOWN SHEET AND TUBE COMPANY
Circle 5-1301 • Box 727 • TWX Sand Springs 480
SAND SPRINGS (TULSA), OKLAHOMA

IS YOUR PIPE SUFFERING FROM CORROLITIS?

If so, here's the cure. For Corrolitis is that head-splitting, nerve-wracking ailment brought on by pipe failure due to corrosion. The fact that Fibercast will not corrode explains its curative properties. Send the coupon for full details contained in the new Bulletin No. 20.

FIBERCAST COMPANY, Box 727, Sand Springs, Oklahoma, Dept. 4118

Send your new Data and Information Bulletin No. 20; also other specific data for _____ application.

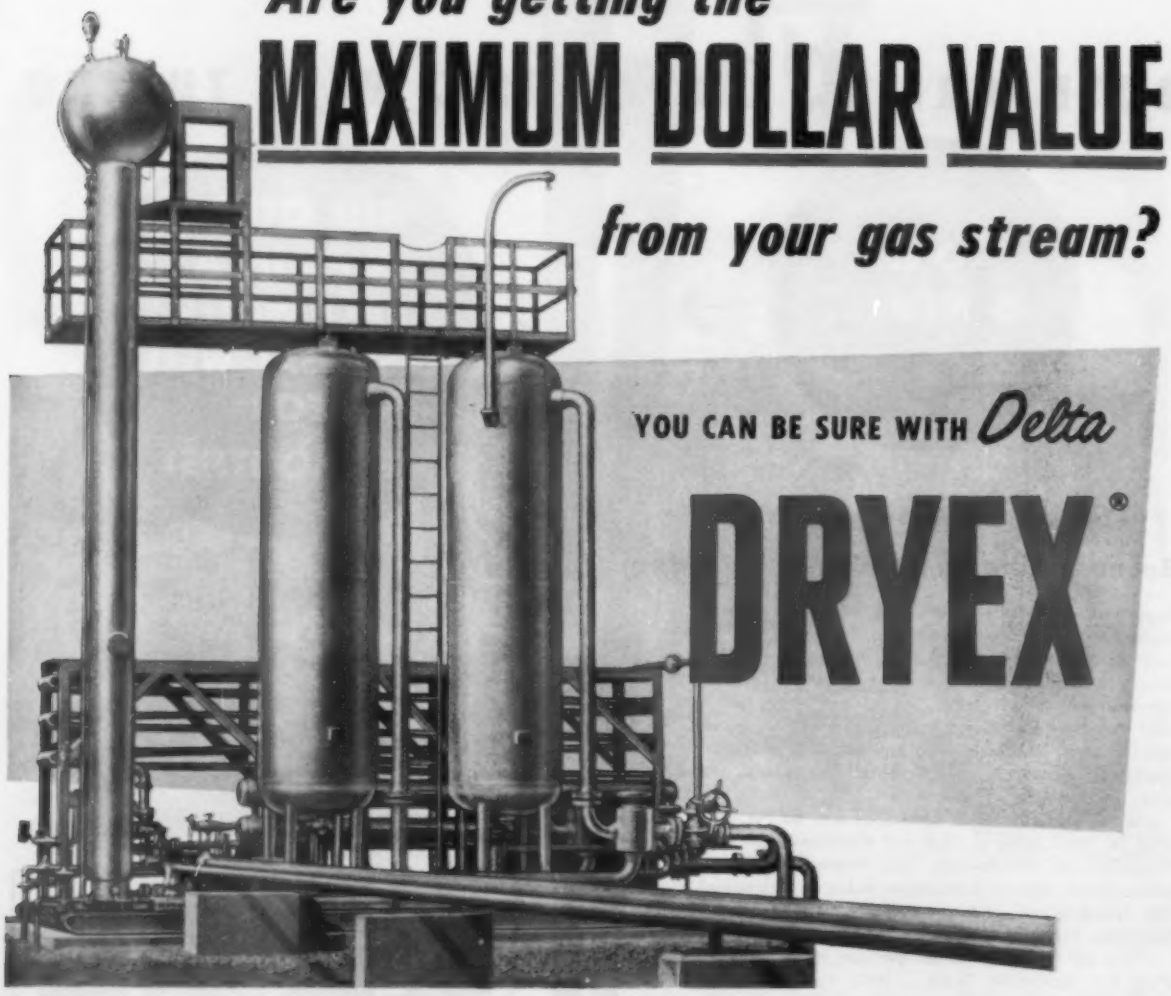
Name _____ Title _____

Company _____

Address _____

City _____ State _____

Are you getting the
MAXIMUM DOLLAR VALUE
from your gas stream?



DE2-8

An adsorption process unit — tailored to your requirements

It's impossible to get maximum profits from your gas stream if you give away certain liquids that can now be recovered by DRYEX. A product of Delta Tank Manufacturing Co., DRYEX is a reliable, efficient unit for dehydration and gasoline extraction from relatively small and lean gas streams. It is a rapid-cycle, fully-automatic, self-contained, skid-mounted unit, already proven in actual lease operation. Let us analyze your gas stream to determine the value of the Delta DRYEX Unit to you. For complete technical information, contact your local Mid-Continent representative.

Mid-Continent Supply Co. is exclusive distributor world wide of Delta oil field equipment.

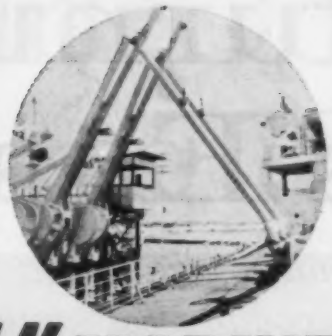
MID-CONTINENT SUPPLY CO.

MID-CONTINENT BUILDING • FORT WORTH, TEXAS
Export Division: 45 Rockefeller Plaza, New York 20, N. Y. Cable: MIDCUMPORT NYK

THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

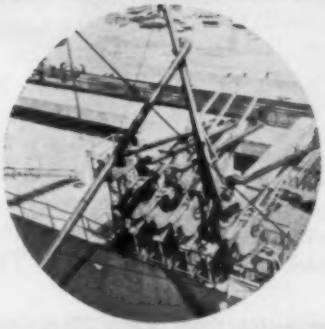
Around the World– in Port after Port...

MARACAIBO



CHIKSAN MARINE LOADING ARMS

LONG BEACH



REDUCE LOADING COSTS...

Increased efficiency and substantial cost reduction are two distinct benefits a Chiksan Marine Loading Arm brings to your tanker transfer operations. With a Chiksan Marine Loading Arm, three men can do the job that formerly required seven men and in just one-third the time.

Add to this the safety factor of all-metal lines, the drastic reduction of hose handling accidents, and hose replacement cost. Consider too, the safety and convenience of clean, uncluttered docks, and the simplifying of flanging up during bad weather. To these add the healthy savings in lower insurance and compensation premiums.

Put these benefits together and you will quickly see how Chiksan Marine Loading Arms can reduce loading costs, speed tanker turnaround time at your loading terminals. Let Chiksan submit a specific proposal for your terminal facilities. Write today.

PHILADELPHIA

SPEED TURNAROUND TIME...

KUWAIT

CHIKSAN MARINE LOADING ARM PAYOUT ANALYSIS

CHIKSAN LOADING ARMS PAY FOR THEMSELVES

An informative bulletin and a Payout Analysis are yours for the requesting. Send for your copies today.

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

fmc CHIKSAN

CHIKSAN COMPANY–BREA, CALIFORNIA • CHICAGO 5, ILLINOIS • NEWARK 2, NEW JERSEY

Well Equipment Mfg. Corp. (Division), Houston 1, Texas • Subsidiaries: Chiksan Export Company • Chiksan of Canada Ltd.

Please Address Dept. 34

#58-30

Trane furnishes Texas Eastern

Trane equipment now operating at Opelousas, Louisiana compressor station

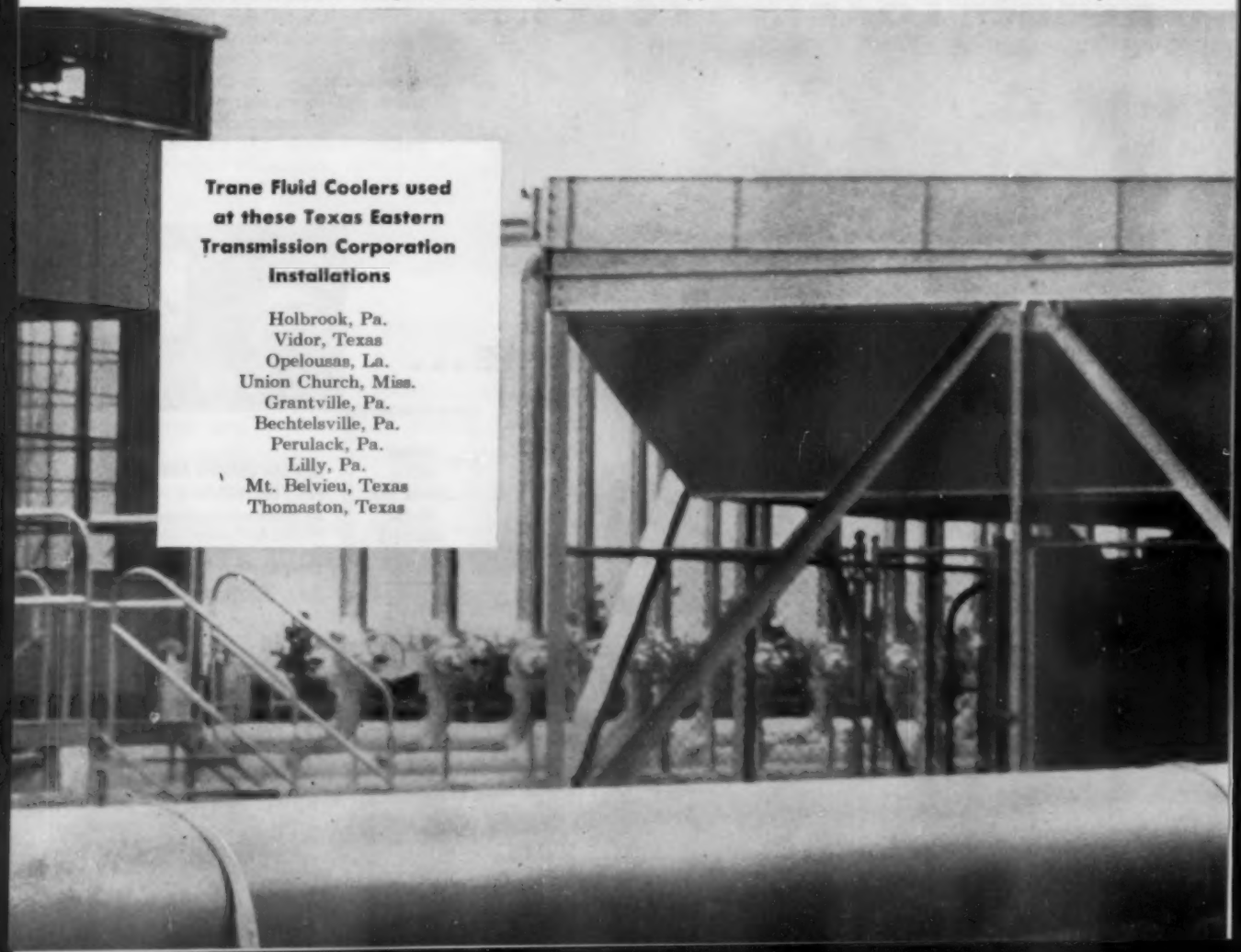
When Texas Eastern Transmission Corporation planned expansion of its Opelousas, Louisiana compressor station from 4 to 6 cells, they used TRANE again for the fluid cooling equipment. It was the *thirteenth* time that Texas Eastern had used TRANE Fluid Coolers.

More and more major pipeline transmission companies are turning to TRANE—*again and again*—for fluid cooling equipment. Many of these users have reported that TRANE Fluid Coolers are rugged, dependable and simply designed—with a minimum of maintenance and adjustment problems.

Unlike many manufacturers, TRANE makes all its own coils—has had thirty years of experience in this highly specialized field. And there are 90 field offices where trained personnel take a responsible interest in every application of TRANE equipment. That's why *you* can turn to TRANE when you have a fluid cooling problem—knowing that TRANE can meet your individual requirements, *and deliver!*

Want more facts? Call your nearby TRANE Sales Office—or write TRANE, La Crosse, Wisconsin.

At Texas Eastern's Opelousas, La. compressor station, four TRANE *Fluid Coolers are used to cool jacket water*



Trane Fluid Coolers used at these Texas Eastern Transmission Corporation Installations

Holbrook, Pa.
Vidor, Texas
Opelousas, La.
Union Church, Miss.
Grantville, Pa.
Bechtelsville, Pa.
Perulack, Pa.
Lilly, Pa.
Mt. Belvieu, Texas
Thomaston, Texas

Fluid Coolers to for the 13th time!

Four 14-foot fans deliver a total of 920,000 cfm. Fan, motor and gearbox are factory aligned on a single metal base. All framework parts are pre-drilled and match-marked for easy installation. Removable header cover plates simplify cleaning and inspection.

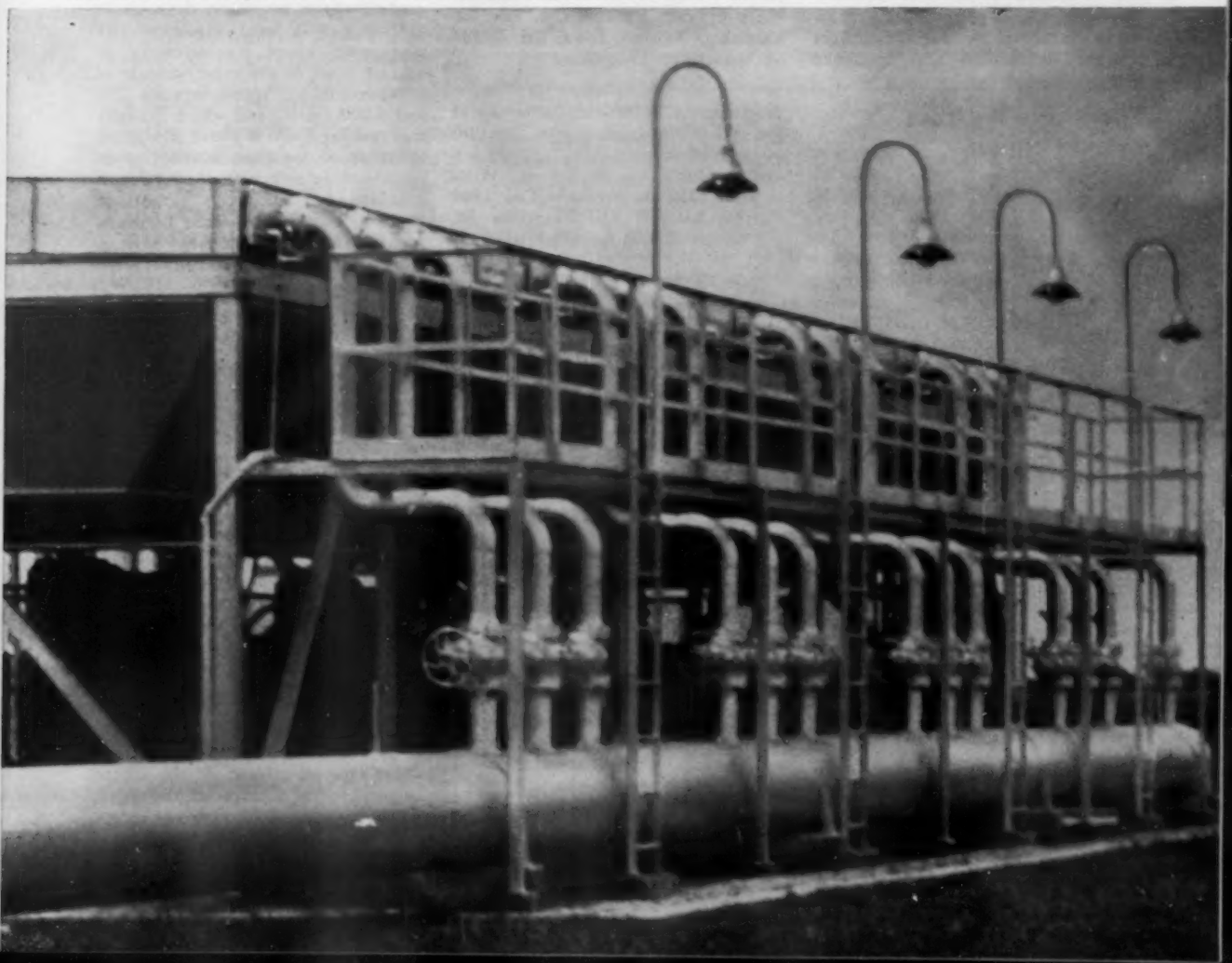
For any air condition, turn to

TRANE

MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT

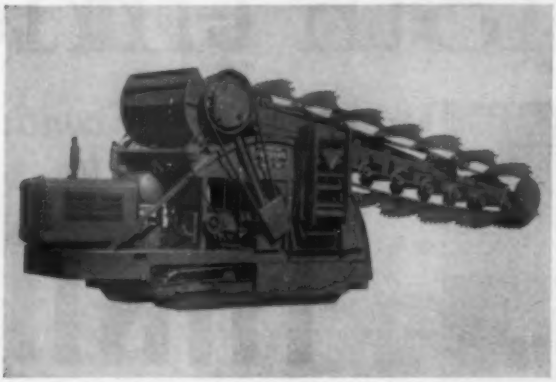
THE TRANE COMPANY, LA CROSSE, WIS. • SCRANTON MFG. DIV., SCRANTON, PA.
TRANE COMPANY OF CANADA, LTD., TORONTO • 90 U.S. AND 19 CANADIAN OFFICES

and lube oil cooling water for six 1760 h.p. gas engine compressors. System engineered by Brown and Root.



▶ ▶ ▶ New Equipment Section

This week's SHOWCASE features . . .



Pipeline trenching machine

. . . has been recently redesigned to include many new working advantages, according to the maker. The machine is capable of handling trenches up to 19 ft. deep and 24 to 72 in. wide.

The Parsons Model 310 Trenchliner can carry dual booms and deposit 4 cu. yards of spoil per minute. According to the maker, the machine's weight is evenly distributed. This, combined with three-point suspension, allows the 310 to maintain uniform ground pressure. Bearing pressure is about 8.6 psi. A reversible power-shift spoil conveyor and an offset telescopic digging boom permit the machine to cut to within 14 in. of obstructions. **Write or call: Parsons Co., Div. of Koehring, Newton, Iowa, for details on Model 310 Trenchliner.**

Spark arrestor traps exhaust carbon

. . . from internal-combustion engines and keeps it from causing a fire. The Gill spark arrestor is almost 100% efficient in trapping incandescent exhaust carbon, according to the maker. It can be used on engines with ratings up to 40 hp. or 150-cu.-in. displacement. Mounting vertically at the end of the exhaust pipe, the unit is made of stainless steel for long life and measures 3¼ by 3½ in. **Write or call: Erickson Products Co., 1960 Carroll Avenue, San Francisco 24, for details on Gill spark arrestor.**

●

Beta calibration sources

. . . for use in radiation-counting processes are now available with Mylar windows of only 1 mg. per cm.² thickness. Maximum definition of the beta spectrum is afforded by the new sources, according to the maker. **Write or call: Isotopes Specialties Co., P. O. Box 688, Burbank, Calif., for details on beta calibration sources.**

●

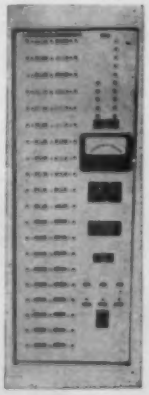
Underspeed governors

. . . for overload protection are speed-sensitive switches which operate on the governor flyweight principle. Contacts are snap acting and can be used to open or close a circuit on greater or less speed. Overload protection is accomplished by adjusting the unit to trip its contacts slightly below normal running speed. External circuitry can be so arranged to stop the equipment when the speed drops. It may also be used strictly as a warning device.

Units can be used on almost any application where it's necessary to operate a set of electrical contacts at a predetermined speed between 250 and 5,000 r.p.m., and where the normal running speed is above trip point. Other speed switches, which contain two or three switching elements, are available for overspeed protection. **Write or call: Synchro-Start Products, Inc., 8151 North Ridgeway Avenue, Skokie, Ill., for details on underspeed governors.**

●

Process-scanning instrument



. . . for petrochemical plants can check several hundred thermocouples in reactor shells and on other operating equipment. It does this at the rate of five per second and determines if any of them exceed the preset common off-normal set point or a preset common alarm set point. If the first setting is exceeded, the time and identity of the off-normal point is recorded on an adding machine type of printer. If the second (higher) setting is exceeded, the system shuts down the plant to insure safety.

A digital display panel allows ther-

Send this **Showcase Coupon**

to the **Manufacturer** of the item in which you are interested. See name, address, and equipment name and/or model, in bold-face type at end of description.

NAME AND/OR MODEL NUMBER.....

.....

Described in **OIL and GAS JOURNAL** - Issue of **Nov. 17, 1958**

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

Maintenance and Steam Traps

. . . there's a relationship that goes far beyond trap maintenance alone

Good traps and good trapping have a greater effect on your maintenance costs than does trap maintenance itself. By that we mean that the right traps, properly selected and installed, and with the benefits of a preventive maintenance program, will save far more maintenance dollars than they will cost.

Under the pressure of spiralling maintenance costs, this thought becomes mighty important. Let's take a look at what it involves:

Proper Selection of Steam Traps

1. Be sure it's the right type of trap.

2. Be sure it's sized right and is for the correct operating pressure.

3. Be sure it's first rate in design and construction.

Proper Installation of Steam Traps

1. Install them so they are accessible for inspection and maintenance.

2. Install a test valve.

3. Use a union or unions.

4. Use a shutoff valve or valves.

5. Use a strainer ahead of the trap if dirt conditions are bad.

6. Use a by-pass only where continuity of service is imperative.

7. Standardize inlet and outlet connections.

Preventive Maintenance Program

1. Test trap regularly for proper operation. (Trap size, operating pressure and importance determine frequency.)

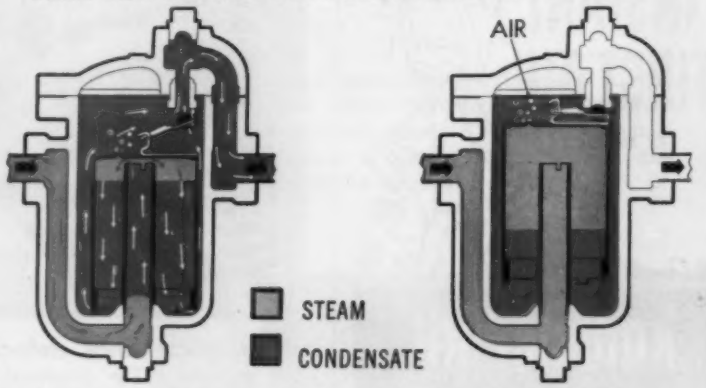
2. Inspect internal mechanism at least once a year.

You Get Indirect Benefits As Well

The direct benefits of the plan outlined are pretty obvious — good traps, properly selected, require less maintenance . . . testing and inspection prevents troubles that lead to maintenance.

However, this plan provides indirect benefits which reduce maintenance in other parts of the plant as well:

HERE'S THE STEAM TRAP DESIGN
THAT CAN REDUCE YOUR MAINTENANCE PROBLEMS



Trap open. Condensate entering trap has caused bucket to lose buoyancy. Weight of bucket times leverage pulls valve open. Air is discharged along with condensate.

Trap closed. Steam has floated inverted bucket; valve is held tightly closed by system pressure. Air entering trap passes through bucket vent and accumulates at top of trap.

burning equipment and on ash handling equipment.

Good traps protect the system by eliminating water hammer and preventing the damage it can do.

Good traps discharge carbon dioxide before it can go into solution to form corrosive carbonic acid — less corrosion, less maintenance.

Good traps increase production to reduce the length of time equipment must operate or reduce the amount of equipment needed . . . either way maintenance is reduced.

How to Go About It (The Sales Pitch)

We admit we're prejudiced, but we don't think there is any better way to select steam traps than with the help of the 44 page Armstrong Steam Trap Book. Here in a single source is specific data on the selection and sizing of traps, how to install them for best results, and how to maintain them most economically.

The Steam Trap Book will also give you full information on the design and construction of Armstrong Inverted Bucket Steam Traps that offer these important maintenance-reducing advantages:

1. Armstrong Traps are dependable.

2. Armstrong Traps require no adjustments — go from full load to zero load automatically.

3. Armstrong Traps are self-scrubbing — ordinary dirt conditions can't hurt them.

4. Armstrong Traps have long-life parts — valve and seat are heat treated chrome steel — lever assembly and bucket are stainless steel.

5. Armstrong Traps have water sealed valves to minimize wire drawing and erosion.

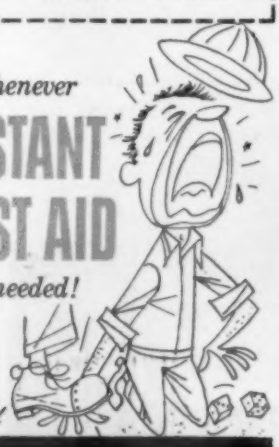
Ask for your copy of the Steam Trap Book—there is no obligation. Then test Armstrong Trapping. If you are not completely satisfied with the results, you can return the traps for a full refund of the purchase price. You can't lose much that way. Call your local Armstrong Representative or Distributor, or write

Armstrong Machine Works
8689 Maple Street
Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

McDONALD PRODUCTS
Safety Designed...
with comfort in mind!

Whenever
INSTANT FIRST AID
is needed!



McDonald

kanister kit

Instant help in dangerous situations! Weatherproof container mounts anywhere—on trucks, posts, trees, in the plant. Snaps open to release roll-up kit containing complete first aid assortment. Kit drapes over arm for easy, antiseptic, self-treatment.

Send coupon today for information and prices

Safety FROM HERE TO THERE

B·F·McDonald Co.
Manufacturers & Distributors of Industrial *Safety* Equipment

5721 WEST 96th ST., LOS ANGELES 45, CALIF.
3745 Greenbriar Dr., Houston 6, Tex.
Distr. in Canada by Mine Safety Appliances Co. of Canada, Ltd.

Please send information and prices on McDonald Kanister Kit.

NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

mocouple inputs to be programed through an analog-digital system and be viewed at the panel. Thus trends can be observed. **Write or call: Hagan Chemicals & Controls, Inc., P. O. Box 1346, Pittsburgh 30, for details on Kybernetes process-scanning system.**

●

Reflectoscope finds defects

. . . in materials. The ultrasonic inspection instrument, Model UR-600, can be useful for ascertaining differences in structure and physical properties and for measuring thicknesses. Its variable pulse-repetition rate allows high-speed scanning of small parts. It can check structural integrity of welds and bonds.

The bright video trace on the edge-lighted screen makes easy reading in daylight and fast interpretation of indications. The reflectoscope is self-contained in an aluminum case. It weighs only 75 lb. and can easily be carried to the test location. **Write or call: Sperry Products, Inc., Shelter Rock Road, Danbury, Conn., for details on Model UR-600 Reflectoscope.**

●

Digital flow indicator

. . . for high-accuracy measurements presents data directly in units of flow (g.p.m. or lb./hr.). Trade-named Model DFI-2, the indicator is based on a servo null-balance design. With either three or four number wheels,

ALLIS-CHALMERS

Plan to stay ahead... MODERNIZE!

ALLIS-CHALMERS

NEW brochure of ideas for modernizing

This booklet is based on the premise that modernization can start anywhere in your plant. It can be a single machine or operation . . . a better way of getting variable speed . . . a faster way to braze . . . or a newly available replacement. In fact, this type of updating is far more common than the sweeping change.

Get a copy of "59 ideas for modernization in '59" from your nearby A-C office or write Allis-Chalmers, Industries Group, Milwaukee 1, Wisconsin.

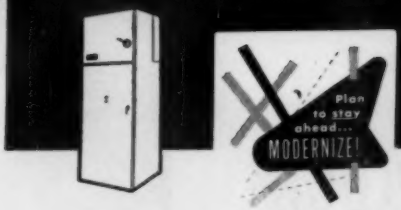
New motor development may eliminate premiums you've been paying for specially protected motors.

Electrical modernization includes placing substations close to machines being served.

ALLIS-CHALMERS

A-5850

Newly designed
Type H Motor Control



Ultimate in protection

for men and machines

Here's the last word in control protection for personnel and equipment! It's all part of Allis-Chalmers newly designed, high voltage control.

1. Gang-operated disconnect switch isolates starter from incoming power—assures safe entry to high voltage compartments.

2. Steel cubicle separates high and low voltage equipment.

3. Short-circuit protection provided by fast-acting current-limiting fuses, rated 150,000 kva at 2300 volts and 250,000 kva at 4160 or 4600 volts.

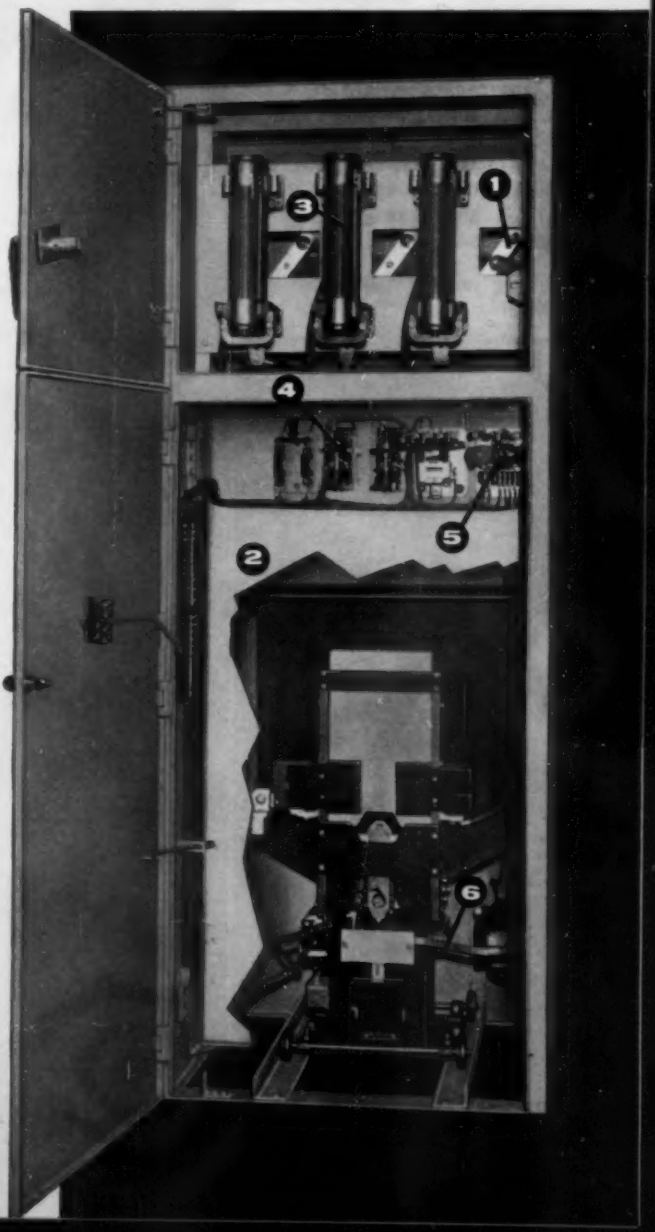
4. Overload protection provided by accurate temperature-compensated thermal overload relays which trip only with excessive motor current, preventing needless motor stoppages.

5. Undervoltage protection instantaneously opens line contactor on loss of voltage. Time-delay undervoltage protection also available.

6. Mechanical interlock coordinates contactor, disconnect switch, outer door and inner control barrier for maximum safety.

This starter line meets every 2300 to 5000-volt motor need. Contact your A-C office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

And maximum protection is only one of the features of this new control line. You also get full-front access, smaller cabinet size (2.36 square feet less than competitive units), a completely tested unit, and ample panel space for optional features.



ALLIS-CHALMERS

A-5521

Low cost

KOCH FLEXITRAYS

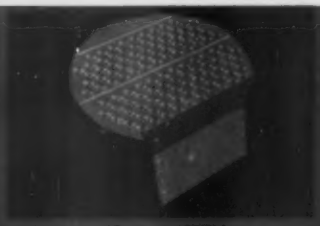
Increase Fractionating Efficiencies in Vickers' new Udex* Extraction Unit

Vickers' new multi-million dollar petrochemical complex built by Procon, Incorporated, is the first petrochemical plant to be built in Kansas, and is expected to produce more than 15 million gallons of petroleum aromatics annually.

Throughout the world, operators have proved that Koch's economical fractionating trays have as much as 25% better efficiency than conventional bell cap trays... give higher capacities, lower pressure drop, and reduce maintenance costs. Over 800 installations have proved the Koch Flexitray's superiority over other devices in capacity, flexibility, and efficiency! KOCH FLEXITRAY—COPIED BY OTHERS—MATCHED BY NONE!

In planning your next tower, consult KOCH!

*Registered Trademark of Universal Oil Products Company



KOCH

ENGINEERING COMPANY, INC.

221 West Douglas Avenue, Wichita 2, Kans.

More than 30 years of tray process design

REPRESENTATIVES

BUTTE, MONTANA

DENVER, COLORADO

EL PASO, TEXAS

HOUSTON, TEXAS

KANSAS CITY 41, MISSOURI

NEW YORK 17, NEW YORK

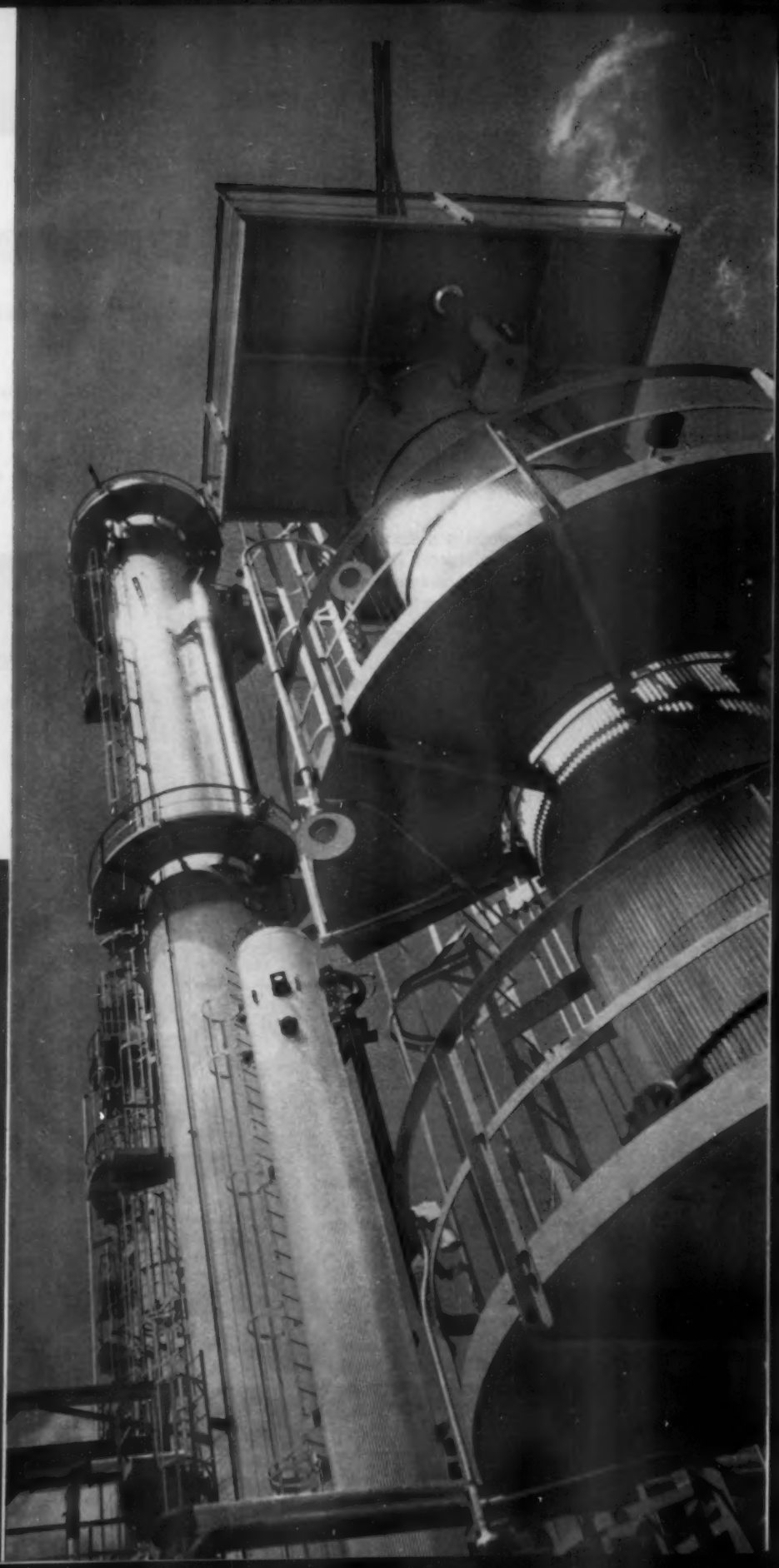
PASADENA, CALIFORNIA

PINE RIDGE, FLORIDA

SALT LAKE CITY, UTAH

SOUTH CHARLESTON, WEST VIRGINIA

TULSA, OKLAHOMA



basic indicator accuracy is ± 0.10% full scale.

Indicator input is from any turbine type of flowmeter with a maximum frequency of 500 pulses per second for full flow. Model DFI-2 features exceptional freedom from line-voltage variations, servo amplifier-gain changes, and ambient-temperature fluctuations, the maker reports. It also exhibits close followup of the signal being measured. These features permit highly accurate flow measurement in laboratory, production, and process uses—wherever fluid flow rates must be accurately known.

The specific-gravity range of Model DFI-2 is 0.2 to 1.2. Where liquids have a varying specific gravity, special equipment is available for continuous, automatic correction. Power to the indicator is 115 volts, 60 c.p.s., and 50 watts. Converters are available for both 6 or 12-volt d.c. operation. **Write or call: Performance Measurements Co., 15301 West McNichols, Detroit 35, for details on Model DFI-2 digital flowmeter.**

●

Thermo-drive valve actuator

. . . uses expansive force of Freon vapor to position valves and other final-control elements with precise and repeatable accuracy. Thus it uses no compressed air, motors, gear trains, pumps, oil, amplifiers, or relays.

Developing a force of 500 lb. and opposed by a 300-lb. return-spring force, the actuator gives a total stroke length of 1.5 in. Response speed is 0.1 in. a second. Precise null-balance positioning is possible at any point within the limits of the actuator.

Operating principle of the actuator is based on the controlled rate of heat release through a fluid medium, Freon, circulating in a closed chamber open only to a condenser. Within the Freon-filled chamber a heavy spring bellows is located. It is coupled to an actuating stem and to a mechanical-position feedback device.

The Freon is continuously vaporized by an integral heater, creating a vapor pressure within the chamber. Varying the Freon bleed rate into the condenser through a release valve provides control action. The unit is ruggedly built, hermatically sealed, and unaffected by ambient temperature, line temperature, radiant heat, or adverse weather conditions, the maker says. It is explosionproof and suitable for Div. 1 locations. **Write or call: Swartwout Co., 18511 Euclid Avenue, Cleveland 12, for Bulletin A900.**

●

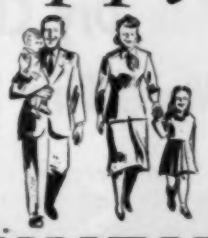
Rotary-gear pumps

. . . are especially adapted for pipeline gathering and oil-treating uses. The two pumps—one electric-motor and the other gasoline-engine driven—are also suited for machine and hydraulic uses where high-volume delivery is required.

The electric-motor-driven pump's capacity ranges from 43 to 48 bbl. per hour, at pressures from 300 to 500 psi. using a 220/440 volt three-phase 60-cycle motor operating at 1,140 r.p.m. The motor is splash and verminproof.

The pump unit for treater-tank serv-

everybody's happy with a WHITMOR field home

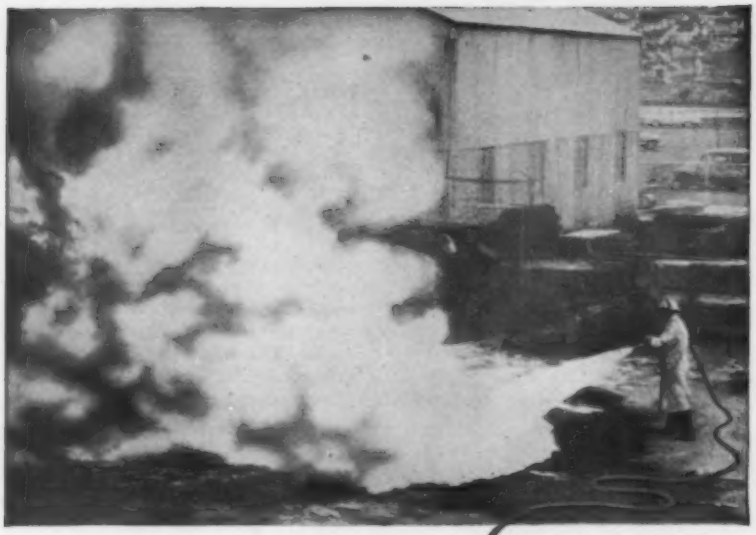


A Turn-Key Job
Site Planning
Nation-Wide Builders
36 Years Experience
Site-Built
Purchase or
"Lease-Rental"
Competitively Priced

Write for catalog of Whitmor distinctive field homes

Your employees will be happy in a Whitmor Field home — Distinctive design, 2 and 3 bedroom, site-built with the finest materials by experienced, skilled crews, and you'll be happy with Whitmor's turn-key job, relieving you of all the usual worries

WHITMOR HOMEBUILDERS INC.
INDUSTRIAL HOUSING
BOX 5037 • TULSA, OKLA.



NEW!

One-Man Dry Chemical Kills More Fire Faster!

This new Kidde pressurized 200-pound extinguisher gets *more* fire-smothering dry chemical on a blaze *faster!* Its universal nozzle discharges a dense 40-foot stream that gives more efficient extinguishing action, greater heat protection for operator.

It has an *extra* 50 pounds of dry chemical to discharge on any stubborn blaze. Not 150 pounds, but a full 200 pounds of dry chemical – a 33⅓% bonus for safety! Yet its total weight is less – no heavy, cumbersome gas cylinder.

It's faster to operate too. No valves to unscrew. No wait for pressurization, for dry chemical to fluff. No pressure reducer to malfunction. Just remove safety pin, swing valve toggle, and flip "on-off" nozzle lever. There's no hose whip either.

Only Kidde has the Bridgeman seal head assembly. When pressurized at 450 psi with nitrogen or *dry* air, an inner force of three tons acts on the seal – the more pressure, the tighter seal. Virtually leak-proof, tamper-proof.

Check these other benefits. A low, balanced center of gravity, wider handle, compact design, and larger, lubricated wheels make it easy to move. It's weather and corrosion protected. And the shielded dust-and moisture-proof pressure gauge tells at a glance this extinguisher's readiness for action.

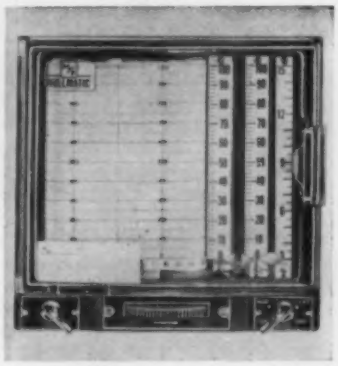
Write Kidde today and get the full story on this new U.L.-approved One Man Fire Engine.

Kidde

Walter Kidde & Company, Inc.
1155 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal—Toronto—Vancouver

ice consists of a sturdily built pump, adapter bracket, coupling, and mounting bolts for direct connection to a gasoline engine. Capacity is rated at 23 bbl. per hour and 100-psi. maximum pressure. **Write or call: Hydraulics Div., Brown & Sharpe Mfg. Co., Providence 1, R. I., for details on pumps for oil-field use.**

●



One station process-control system

. . . for cascade control is available in both indicating and in recording models. It performs all operations of the two stations formerly required for each cascade system, the maker reports. Thus it saves the cost and panel space of a second station and simplifies switching controllers to cascade, automatic, or manual operation.

To transfer between any two control positions, an operator need only use one knob. The cascade controller fits a panel cutout measuring 5⅞ by 5¼ in. It uses O-ring and plunger type of switches. The recording model has a 4-in. wide, 31-day chart with scales for flow, temperature, pressure, and other process variables. **Write or call: Moore Products Co., H and Lycoming Streets, Philadelphia 24, for details on single-station cascade-control system.**

●

New filter-conversion kit

. . . converts existing "hay-bale" type of horizontal fuel separators or dehydrators in the 300 and 600-g.p.m. sizes. New series units are called PA-3561 (300 g.p.m.) and PA-3408

Join the thousands using

THE OIL STATES

SWAB

... that sets the

Standard for Industry

✻ Only SIX PARTS required

✻ Perfect for sanding conditions

Note adequate flow through passage.

✻ Unrestrained tops . . . respond to lightest or heaviest loads

✻ Positive valving with each cup

Cup in closed position showing rubber impinged seal.

✻ No ball and seat to wear

Sold through Supply Stores Everywhere

Oil States

OIL STATES RUBBER CO.

OSR-1 Arlington, Texas

Structural steel can now be delivered promptly and when required.

ONE

makes

FOUR

FOUR distinct divisions in **one** steel company, inter-related, specialists in their own field of endeavor and singly managed.

Some clients take advantage of all **four**, others one or more.

Fabricated Structural Steel and Fabricated Reinforcing Steel for Bridges, Commercial and Industrial Buildings: Schools, Hospitals, Power Plants, Coal Washing Plants.

Galvanized Structural Steel for Electrical Transmission Towers and Substations.

Carbon Steel Warehouse Products: Structural and Bar Shapes, Plates, Hot and Cold Finished Bars, Construction Products.

Pressure Vessels fabricated to the ASME Code from Carbon, Alloy, and Alloy Clad Steels for the Chemical and Petroleum Processing Industries.

for over 40 years

FLINT STEEL CORPORATION

TULSA . . . MEMPHIS

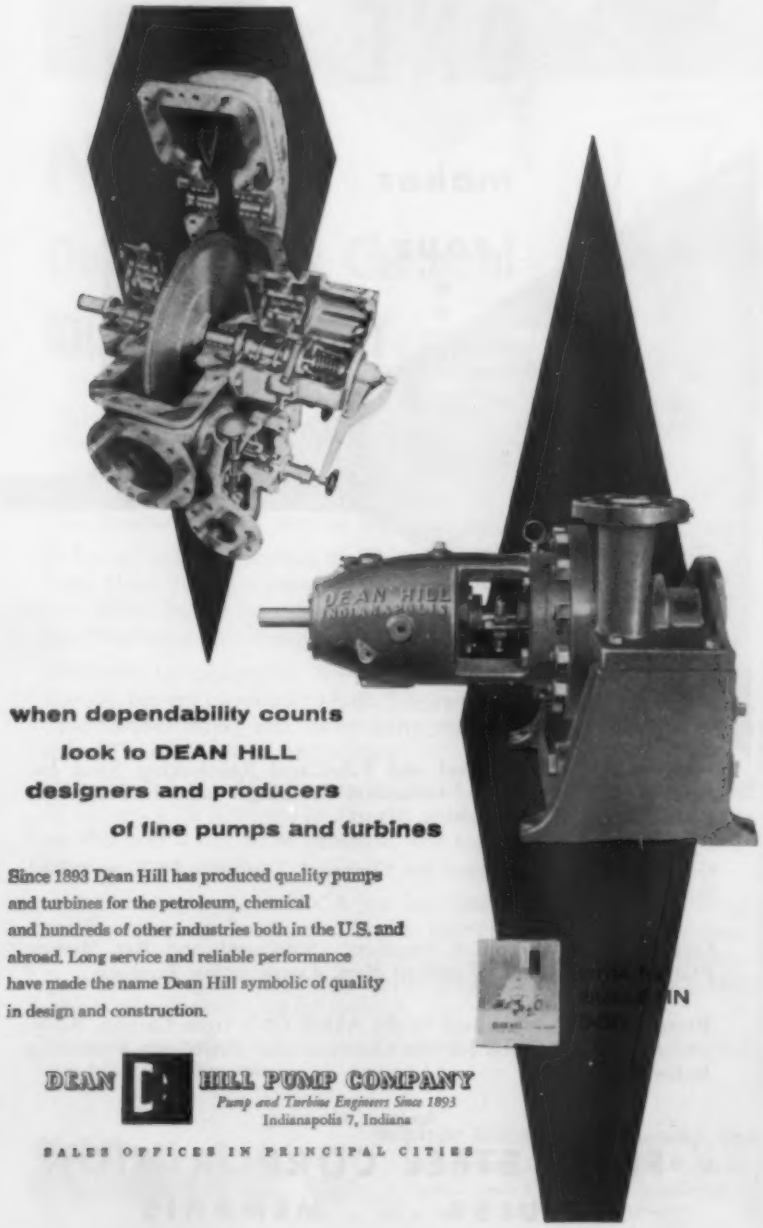
SHOWCASE . . .

New Equipment

(600 g.p.m.). They are supplied with micronic coalescer elements to remove both solids and water from jet and other aviation fuels.

Installation doesn't require welding, tank modification, additional piping, or disconnection of inlet-outlet. Elements may be replaced individually. The conversion units are made of aluminum, thus eliminating the danger of sparking. The conversion kits can be serviced easily by one man. Only the kit's coalescer elements need periodic servicing, the maker claims.

Standard specifications for the 300-g.p.m.-size kits are 24-in. tank i.d., 61-in. minimum center distance between inlet and outlet; and 4-in. connections. Coalescer elements are 24 in. long by 3¾ in. o.d. Net weight is about 115 lb. For the 600-g.p.m size, specifications are 30-in. tank i.d., 69-in. minimum center distance between inlet and outlet; and 6-in. connections. Coalescer elements are 24 in. long by 3¾ in. o.d. Net weight is about 200 lb. **Write or call: Purolator Products, Inc., Rahway, N. J., for details on filter-conversion kit.**



when dependability counts
look to DEAN HILL
designers and producers
of fine pumps and turbines

Since 1893 Dean Hill has produced quality pumps and turbines for the petroleum, chemical and hundreds of other industries both in the U.S. and abroad. Long service and reliable performance have made the name Dean Hill symbolic of quality in design and construction.

DEAN HILL PUMP COMPANY
Pump and Turbine Engineers Since 1893
Indianapolis 7, Indiana

SALES OFFICES IN PRINCIPAL CITIES

Valve has replaceable rubber seat

. . . and is made of stainless steel to resist corrosion. The seat is able to achieve a drip-tight seal in both directions. The Fig. 17 valve can be used as either a wedge gate or as a stock valve.

It handles slurries and sludges as well as liquids and gases. A smooth flow design is employed to eliminate pockets. The die-formed body permits easy pipeline assembly, the maker says.

The valve comes in wafer, standard, or special dimensions. A motor or cylinder mount is optional for automatic operation. **Write or call: W. G. Rovang & Associates, Inc., 1945 North Columbia Boulevard, Portland 17, Ore., for details on Fig. 17 valve.**

●

Low-pressure-range protector

. . . offers protection for incline manometers, draft gages, electrical pressure switches, and ultra-sensitive, low-pressure transducers. Called Gage Gard Jr., the unit has been designed for either atmospheric or relative-pressure system uses.

Gage Gard is repeatable and will reopen after sealing at 2% below the cutoff point. Adjustment and resetting of cutoff pressure-point can be made at any time. The device is available in four ranges, for pressures to 85 psig. **Write or call: Industrial Engineering Corp., 525 East Woodbine, Louisville, Ky., for details on Gage Gard Jr.**

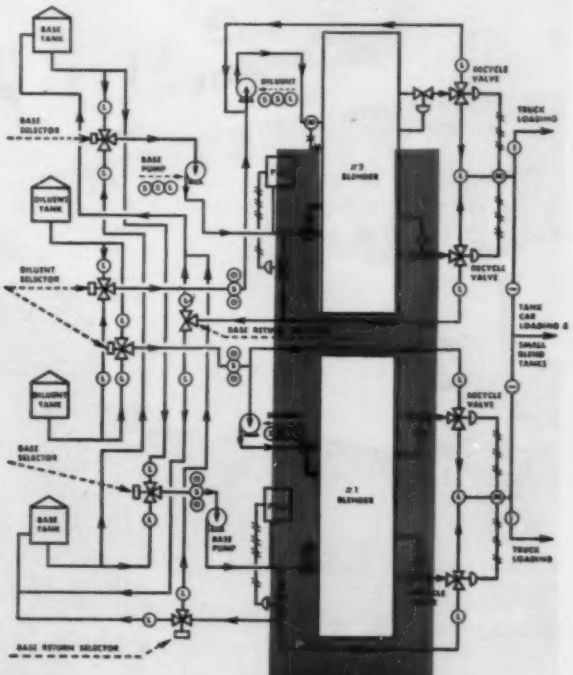
●

"Stop-and-go" pipe fitting

. . . for 2-in. gas mains serves both as a terminal fitting and as a pipe coupling. It can thus prove valuable as a terminal fitting on gas mains which are to be extended at a later date. To extend a main, just remove the end nut and line cap from the ex-

POSITIVE CONTROL OF MATERIALS IN MOTION

Phillips 66



At Phillips'
Wood Cross (Utah) Refinery . . .

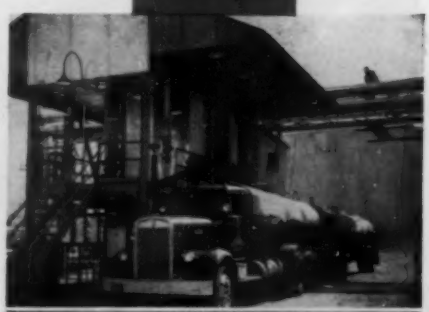
SINGLE-PASS ASPHALT BLENDING

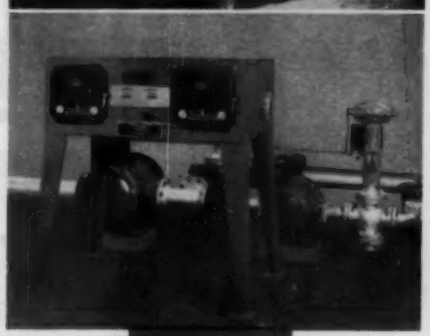
Streamlines Cutback Shipments!

With the booming market for paving asphalts requiring "around-the-clock" loading at the Woods Cross Refinery, Phillips is proving the advantages of Proportioneers continuous, automatic in-line blending equipment. This system permits personnel . . . without leaving the loading dock . . . to line up the proper asphalt and cutter stock, to set and reproduce any required blend, and to load the road oil (as a stable end product of predetermined viscosity) in a single operation . . . directly to mobile equipment.

This Proportioneers system reduces any fire hazard, loss of time and materials, and the need for reblending and subsequent mixing. The two Proportioneers Two Component Blenders were furnished as "packaged" units, complete with control system, flow meters, strainers, and control valves.

Streamline your asphalt operation for maximum production. Request Bulletin DM-1 for complete data. Write **B-I-F Industries, Inc., Dept. P, 377 Harris Ave., Providence 1, R. I.**





B-I-F

B-I-F INDUSTRIES

BUILDERS-PROVIDENCE · PROPORTIONEERS · OMEGA

BUILT & SHIPPED... ON TIME

Today, modern oil refineries and chemical plants require more and more complicated pieces of fabricated equipment—too large to ship by rail or road. To meet this need, Sun Ship specializes in building and shipping large carbon or alloy steel units by water (inland, coastal or overseas)...directly from our plant.

SUN SHIP
BUILDING & DRY DOCK CO.
CHESTER, PENNSYLVANIA

tension end of the fitting. The end nut is then replaced and the extension piping stabbed into the fitting, breaking the diaphragm seal. This is easily done without any obstruction or mechanism being left in to block the main. The joint is completed by tightening the end nut.

Extensions can be made without shutting off the main at pressures to 30 psi. The Stop-N-Go fitting handles working pressures to 60 psi. A ¼-in. purging outlet in the fitting body allows easy line purging. **Write or call: Dresser Mfg. Div., One of the Dresser Industries, Inc., Bradford, Pa., for details on Stop-N-Go fitting.**

•

Drum truck eases barrel handling

. . . and speeds barrel movement. The Hustler drum and barrel truck is designed for all-around barrel-handling ease. It is balanced so the load is carried by it, rather than the operator.

The unit's curved tubular handle is welded to a square stem of heavy-walled tubing. The cradle and axle-supporting mounts are welded together to form a strong loading and carrying vehicle. Loads are held securely on inclines, uneven floors, and while loading or unloading pallets. It comes with all-metal or rubber-tired wheels. Capacity is 1,000 lb. **Write or call: Modern Equipment Co., 2007 Cuming Street, Omaha 2, for details on Hustler barrel truck.**

•

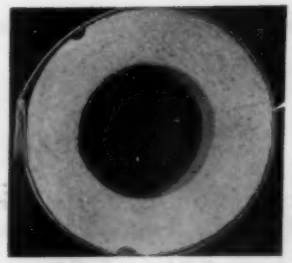
Lubrication-alarm system protects

. . . compressors, engines, and other machinery from damage due to lack of lubrication. Called Lube-Line Alert, the product is installed at each terminal point of lubrication by simply cutting the line and connecting the fittings. It is then connected electrically to any desired audio, visual, or mechanical warning device. Interruption of lubricant flow through it activates the signal.

The Lube-Line Alert can be used with any viscosity oil or synthetic lubricant, the maker says, at pressures to 10,000 psi. And it's available in explosionproof units. **Write or call: Manzel, a division of Houdaille Industries, Inc., 315 Babcock Street, Buffalo 10, N. Y., for details on Lube-Line Alert.**

•

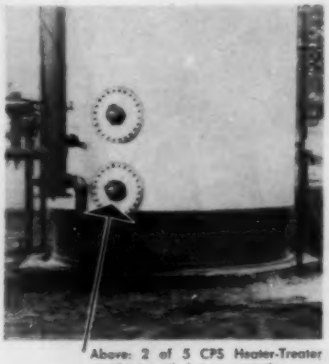
Insulation and jacket package



. . . speed installation of insulation on pipes. The calcium silicate pipe insulation and aluminum jacket are both in a single package and allow installation in one operation. Called Metal-On, the insulation package is designed for temperatures to 1,200° F. It is a combination of 0.016-in. aluminum integrally combined with a vapor barrier and permanently attached to sections of pipe insulation.

The complete unit is installed by

TRICKS... for... TREATERS



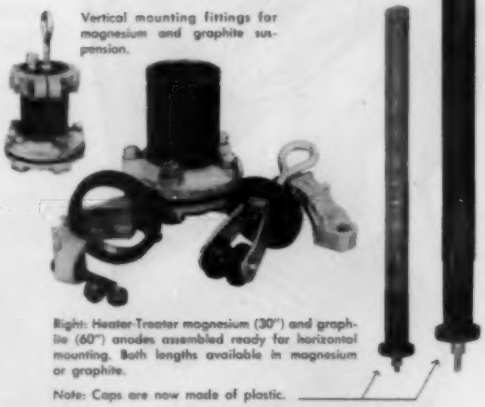
Above: 2 of 5 CPS Heater-Treater Anodes installed in a vertical treater.

Oilfield emulsion treaters and related equipment . . . handling corrosive brines . . . can well use a few *tricks* . . . to prolong their woefully short life in such service.

CPS has developed, over the past five years, a complete line of cathodic protection materials . . . rectifiers, graphite and magnesium anodes, deck mounts, control boxes, plus other items for use on this specific corrosion problem.

Standard designs have been worked out for the more widely used models of oilfield vessels, in cooperation with the manufacturers.

For complete information, please call or write your nearest CPS office, or consult with your tank company representative.



Vertical mounting fittings for magnesium and graphite suspension.

Right: Heater-Treater magnesium (30") and graphite (60") anodes assembled ready for horizontal mounting. Both lengths available in magnesium or graphite.

Note: Caps are now made of plastic.

CPS

cathodic protection service

P. O. Box 6387 — Houston 6, Texas — JAckson 2-5171

Corpus Christi
1620 South Brownlee
TUlip 3-7264

Odessa
5425 Andrews Hwy.
EMerson 6-6731

New Orleans
1627 Felicity
JAckson 2-7316

Denver
(Golden) P. O. Box 291
CRestview 9-2215

Tulsa
4407 S. Peoria
Riverside 2-7393

Cable Address—CATPROSERV

Why Is RIDGID The World's Most Popular Pipe Wrench

...because it was a better pipe wrench when first created 35 years ago, and has been improved nearly every year since . . . in performance, design, materials. Today, it is still the most for your money. Buy RIDGID at your Supply House.

The Ridge Tool Company, Elyria, Ohio, U.S.A.

INCREASE PROFITS WITH

REDA

Submergible PUMPS

REDA GIVES YOU THESE COST SAVING FEATURES AND DOES THE JOB BETTER!

- Lower cost for installation, operation and maintenance.
- 250 to 18,000 BPD capacities
- Depths to 10,000 ft.
- Corrosion-resistant construction
- Long life — dependable service
- A complete line to meet pumping requirements

and

INVESTMENT COST IS FAR LOWER WHEN YOU CHOOSE REDA FOR YOUR PUMPING NEEDS.

Write or call for more information. Reda engineers will be pleased to assist and help plan your operations.

REDA PUMP COMPANY
BARTLESVILLE, OKLAHOMA

Manufacturers of submergible motors and pumps for over 35 years — for oil, brine and water wells, gasoline and jet fuel —

snapping it onto the pipe. Joints are sealed with metal "snap straps" held in place with mechanical fasteners. The insulation package comes in 36-in. sections in pipe sizes up to 24 in. and 3 in. thick. **Write or call: Johns Manville, 22 East Fortieth Street, New York 16, for Booklet IN-217A.**

•

Battery powers portable winch

. . . for cars or trucks. The My-Te winch lifts 2,500 lb. and pulls 5,000 lb. It works off any 6 or 12-volt battery and can handle a variety of lifting and pulling jobs.

It's lightweight and compact, weighing only 60 lb. and measuring 27 in. long, 12 in. wide, and 14 in. high. Lifting capacity is 1,250 lb. on one line and 2,500 lb. on a double line. Drum speed is 32 r.p.m. and drum capacity is 150 ft. of ¼-in. cable. **Write or call: City Engineering Co., Inc., 3547 Massachusetts Avenue, Indianapolis 18, for details on My-Te winch.**

•

Air-cooled diesel engines

. . . made in Germany are now available in two basic models—a 7-hp. 2,500-r.p.m. model and a 12-hp. 2,000-r.p.m. model. They weigh 110 and 190 lb., respectively.

The new one-cylinder J1o diesels feature cast-aluminum cylinder block, crankcase, and piston. They offer what is believed to be the lowest weight per brake horse power of any air-cooled diesels in their size range which is less than 16 lb.

The lighter model—Series J1o-325—offers a 2.75-in. bore, 3.35-in.-stroke, and 20-cu. in. piston displacement; it is 13¼ in. long, 14 in. wide, and 14.7 in. high above the crankshaft. Series J1o-660 measures 18¾ by 25⅛ by 17⅝ in. It has a 3.55-in. bore, 4.1-in. stroke, and 40 cu.-in. displacement. **Write or call: Hercules Motors Corp., Canton, Ohio, for details on J1o 325 or 660 engines.**

When You Want It "Tight"
AND
You Want it "Tomorrow"...

Specify

BOLTED STEEL TANKS

MASTER-CRAFTED BY COLUMBIAN

You don't have to choose between quality and speed when you need a tight tank in a hurry. Columbian tanks just naturally "fit up" better — and therefore go up faster. Equipped with the most modern, proven sealing methods and materials, they stay tight over many years. And for that rush installation, pick up your phone and call your nearby Columbian Distributor:

COLORADO
O'Neill Tank Co.
STERLING

KANSAS
O'Neill Tank Co.
GREAT BEND
HAYS
HILL CITY
MEADE

LOUISIANA
McClathey Tank & Supply Co.
LAFAYETTE

McGuffin Tank Co.
SHREVEPORT

NEBRASKA
O'Neill Tank Co.
KIMBALL

NEW MEXICO
Allied Supply Co.
ARTESIA
American Tank & Steel Co.
FARMINGTON

TEXAS
Miller Tank Co.
ABILENE

B. A. Box Tank & Supply Co.
BEEVILLE
Federal Tank Co., Inc.
BELLAIRE
Martin Tank Co.
CORSICANA
Texas Gulf Tank Co.
HOUSTON
Columbian Steel Tank Co.
(Warehouse)
3705 McKinney Ave.
HOUSTON
Martin Tank Co.
KILGORE

Gray-Brown Tank Co.
LONGVIEW
Mapp Tank Co.
ODESSA
Westex Tank Co.
ODESSA
Panhandle Steel Products Co.
WICHITA FALLS

CANADA
C W S Tank Co.
CALGARY, Alta.
EDMONTON, Alta.
ESTEVAN, Sask.

RIGID-FRAME STEEL BUILDINGS, too...
New, Rigid-Frame designs are ready for quick erection of warehouses, pump houses, tool sheds, field offices, etc. They're flexible, removable, fire-safe—Master-Crafted in a great variety of sizes and designs by Columbian. Your Columbian distributor can supply you.

RUBBER LINED TANKS available in bolted or welded storage tanks, pressure vessels and special designs to customers' specifications. Linings for handling corrosive materials engineered to your requirements. Linings applied after fabrication. Ask us about storage for your hard-to-handle liquids.

Write **for Columbian's Bolted Steel Tank booklet and new Rigid-Frame Steel Building folder. They show you why Columbian steel tanks and buildings are stouter, tighter, longer-lasting. Both booklets are free.**

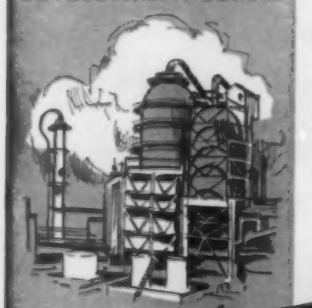
COLUMBIAN STEEL TANK CO.
P. O. Box 4048-J Kansas City, Mo.

STEEL, Master-Crafted by Columbian.. First for Lasting Strength

INDUSTRY LOANS

PRODUCTION LOANS

DEVELOPMENT LOANS



EXPANSION LOANS

Oil Men Call Us

"Bankers".....but

BANKERS

CALL US

"OIL MEN"!!!

One of the largest Oil Credit files in the U. S. Let us prove that "in oil matters it pays to Think . . . FIRST"

COMPLETE ENGINEERING AND OIL DEPARTMENT

W. L. KENDALL—Senior Vice Pres.

M. R. BILLINGTON—Asst. Vice Pres.

W. L. MORRIS—Engineer

A. D. McCALL—Engineer

IN OIL MATTERS — *IT PAYS TO* . . .

Think 1st *of Tulsa*

FIRST NATIONAL BANK & TRUST CO.

SINCE 1895

Member Federal Deposit Ins. Corp.

DESIGNED FOR

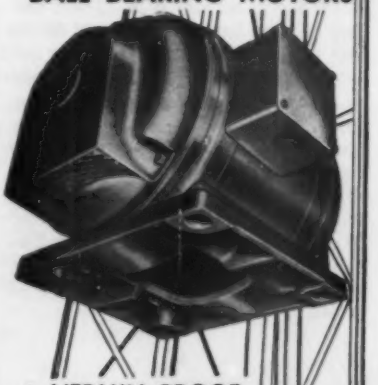
. . . TESTED

AND PROVEN

IN THE OIL FIELDS

FIELDMASTER

BALL BEARING MOTORS



- **VERMIN PROOF**
- **DRIP PROOF**
- **CORROSION RESISTANT**
- **MOISTURE PROOF**
- **FORCED AIR COOLED**

Yes . . . all these features are combined in Fieldmaster Ball Bearing Motors to make them the leading power units in the oil country. Naturally there's a type and H.P. especially suited to fit your specific requirements.

Contact us for complete information on any motor requirement.

BETHLEHEM SUPPLY COMPANY

TULSA, OKLAHOMA

Manufactured by

VALLEY ELECTRIC CORP.

ST. LOUIS 8, MISSOURI

SHOWCASE . . .

New Literature

Communication batteries

. . . are described in new 16-page Bulletin T-533. It covers the use, design, and construction of a line of lead-antimony-grid batteries for telephone, carrier, and microwave service. The bulletin includes cell data on the batteries with ratings from 10 to 1,680 amp.-hr.. curves on discharge characteristics, rack data, and accessory details. **Write or call: C&D Batteries, Inc., Washington and Cherry Streets, Conshohocken, Penn., for Bulletin T-533.**

Glass-fiber pipe insulation

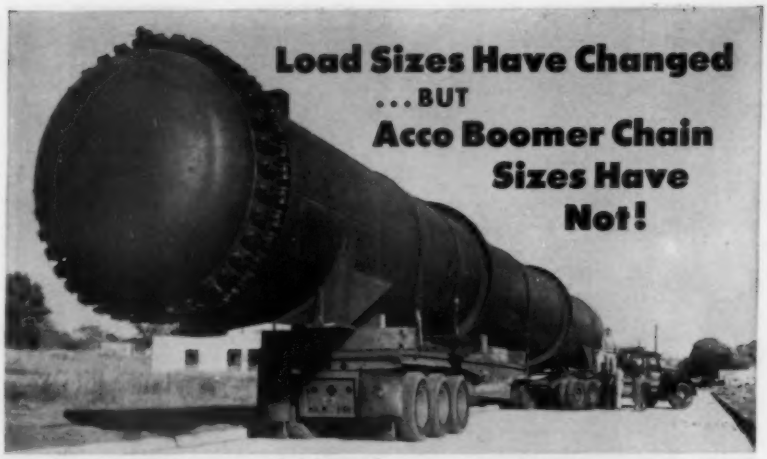
. . . for temperatures from subfreezing to 350° F. is described in a new eight-page folder. The glass-fiber Micro-Lok pipe insulation features spring-hinge opening and closing and easy installation. The folder gives physical properties, thermal conductivity, and various types of factory-applied jackets. A comparison of insulation thicknesses required for equal efficiencies, specifications, and dimensions also are included. **Write or call: I•O•F Glass Fibers Co., 1810 Madison Avenue, Toledo 1, for Micro-Lok Pipe Insulation Folder.**

Midget valves and fittings

. . . described in a new eight-page brochure provide minimum capacity in capillary and small-diameter, high-pressure tubing systems. Four tubing connections are explained. Two-way and three-way midget valves and a combination valve are diagramed. Included are straight-through angle, tee and cross type of fittings, safety-head assemblies, and ball check and twin-seal check fittings. The valves and fittings come in working pressures from 10,000 through 60,000 psi. for 1/16 and ⅛ in. tubing and ⅛ and ¼-in. NPT connections. **Write or call: High Pressure Equipment Co., 1222 Linden Avenue, Erie, Penn., for Catalog 658.**

Stainless-steel pipe fittings

. . . are detailed in a new 86-page master reference volume. It gives detailed information on screwed and socket welding fittings and ASA, MSS, and corrosion-weight flanges. A technical section includes data on manufacturing standards, specifications, and welding of stainless-steel, and corrosion-resistance tables. The catalog is tab-indexed for quick reference. It provides a single-source reference to all who specify, buy, or install stainless-steel and nonferrous - alloy pipe



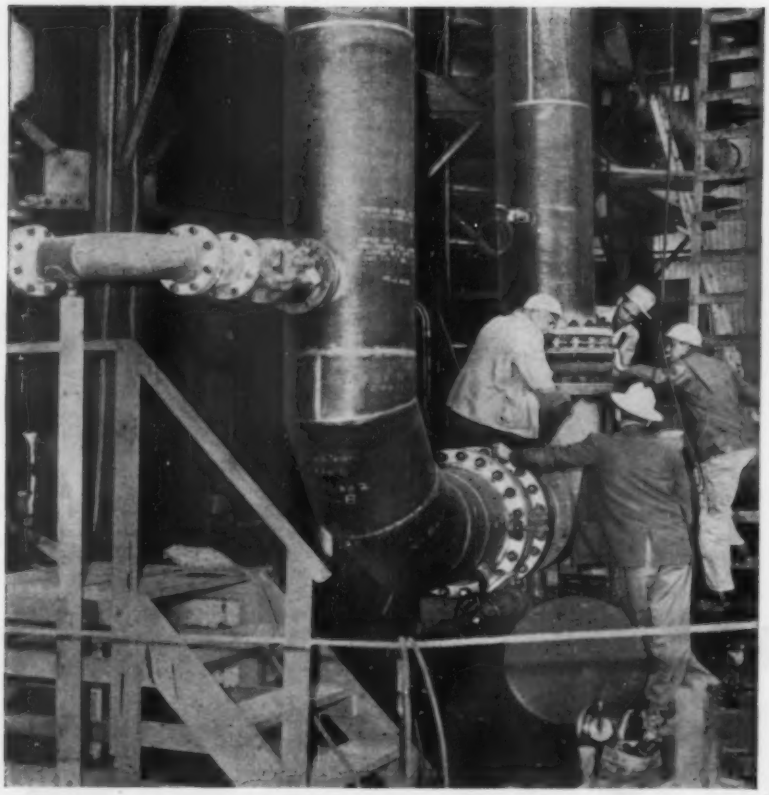
• Year after year, trucks have been called upon to carry heavier loads in all phases of petroleum operation. And yet, while load sizes have skyrocketed, the size of chain necessary to do a safe, effective tie-down job has remained nearly the same. Ever wonder how this can be? It's due primarily to technological advancements in the manufacture of chain from better grades of steel which make it possible to move heavier loads faster at no appreciable increase in chain size or weight. • An outstanding example of such a chain is ACCO Boomer Chain. Made from High Test Steel or Accoloy steel in 20-foot lengths, they have drop-forged Alloy Grab Hooks (I-Beam Type) on each end. The hooks are factory attached and factory proof-tested. High Test Boomer Chains come in six sizes, from ¼" x 20 ft. through ⅜" x 20 ft. Chains of Accoloy are made in four sizes, ⅜" x 20 ft. through ⅝" x 20 ft.

ACCO

American Chain Division
AMERICAN CHAIN & CABLE
Bridgeport, Conn. • Factories: *York and *Braddock, Pa.
Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, New York, Philadelphia, Pittsburgh, *Indicates Warehouse Stocks *Portland, Ore., *San Francisco

ACCO for Better Values

Up East millions of people simply turn a knob to conjure up a genie Aladdin never dreamed of—a genie of warmth and power. In home and industry, Easterners have Texas-Louisiana gas producers to thank for this genie. Transco, like Aladdin's lamp, is happy to carry the genie where the most people are.



Erecting pipe at a potash refinery in Carlsbad, N. M. operated by the U. S. Potash Co., a division of U. S. Borax & Chemical Corp. After nine months service, there is no sign of stress-corrosion cracking—yet pipe and fittings were not stress-relieved or heat-treated during fabrication.

Field-fabricated without stress-corrosion cracking!

Pipe and fittings are of NEW AMPCO METAL GRADE 8

Forget your old ideas about fabricating copper-base alloy equipment to handle steam and corrosive media at elevated temperatures. New — *entirely new*—Ampco Metal Grade 8 changes all that!

Now, for example, you can get pipe and fittings that

- ... can be field-assembled, without stress-relieving — yet won't stress-corrosion crack!
- ... provide many times greater protection against corrosion and erosion
- ... can be readily welded
- ... can be formed on standard equipment
- ... are too tough to be chewed or crushed by wrenches
- ... are available in all standard types and sizes — also specials.

At one major oil refinery, field-assembled piping of Ampco Metal Grade 8 has handled hot sulphuric-acid sludge for a year and a half without stress-corrosion cracking.

Sound promising? It is! Ask your Ampco field engineer about new, patented Ampco Metal Grade 8. Or write for details. *Ampco Metal, Inc., Dept. 169-K, Milwaukee 46, Wis. West Coast plant: Burbank, Calif. —Southwest plant: Garland (Dallas County), Texas.*

73-3

AMPCO®

AMPCO

fittings. **Write or call: Ladish Co., Cudahy, Wis., for Stainless-Steel Fittings Catalog.**

Electric-weld steel pipe

... design properties and working pressures for Grades B, X-42, and X-46 in sizes from 1 through 4 in. are given in a new four-page, multi-colored brochure. The brochure also pictorially illustrates the equipment and processes involved in the manufacture of electric-weld line pipe. **Write or call: Southern Sales & Transportation Co., 3600 Clinton Drive, Houston, for Electric-Weld Line Pipe Brochure.**

Teflon-trim globe valves

... are described in new Brochure L-475. It covers both screwed and flanged-type globe and angle valves. The brochure includes (1) an ordering chart which gives dimensional data on valves from ¾ to 3 in., (2) a table of materials, (3) flange dimensions, (4) a cutaway view of a typical valve showing the internal design and working parts, and (5) a table of available accessory items. The back page lists more than 180 gases and liquids for which the valves are suited. **Write or call: Bastian-Blessing Co., 4201 West Peterson Avenue, Chicago 46, for L-475 Brochure.**

Mechanical seals

... for all makes, models, and sizes of centrifugal pumps, are described in a new four-page folder. Using precision-lapped faces, the seals are designed to withstand extreme temperatures and pressures without leakage. They are also said to eliminate the periodic down-time for repacking, as is associated with a conventional stuffing box. **Write or call: Mechanical Seals Div., Borg-Warner Corp., P. O. Box 2017, Terminal Annex, Los Angeles 54, for Mechanical Seals Folder.**

Oil-lubricated plunger

... known as "Oilmaster" is described in new four-page Technical Bulletin EC 5805. The bulletin covers operational details, general description, specifications, and cataloged parts information. **Write or call: Fluid Packed Pump Co., P. O. Box 64, Los Nietos, Calif., for Technical Bulletin EC 5805.**

Lightweight field trailer

... which can be carried by helicopter or airplane is described in a new single-page bulletin. Known as Air-Lift, the trailer has been designed specifically for field crews working in remote locations accessible only by air. Air-Lift trailers are available in

SURE SERVICE - SURE SUPPLY

WHEREVER THERE IS OIL!

In the United States, in Canada, or in Venezuela, oil men are finding sure service and sure supply wherever Mid-Continent's familiar neon-lighted derrick shines. Mid-Continent supply stores and stocking points at strategic locations throughout the world are equipped with mobile two-way radios to assure fast dependable delivery to active oil areas. Experienced engineering personnel are on call around the clock to help you select the equipment that meets your specific drilling requirements. For complete supply service, around the world . . . around the clock, call your Mid-Continent representative.

MID-CONTINENT SUPPLY CO.

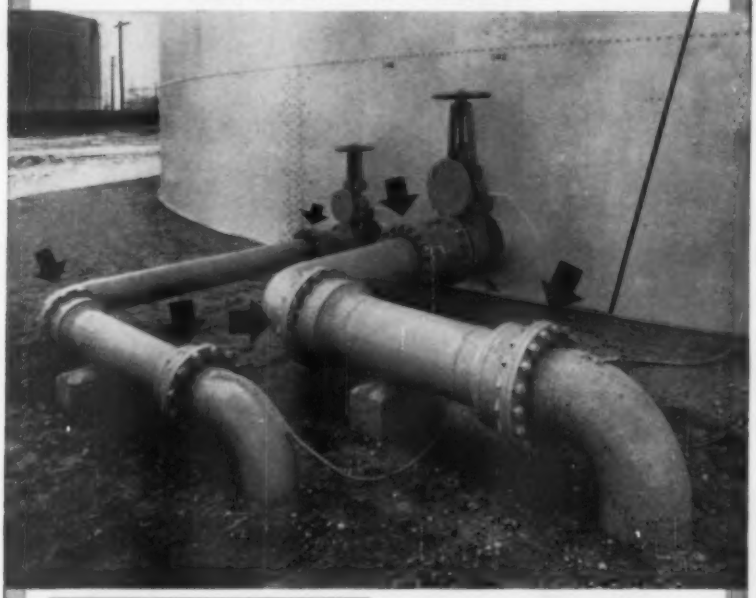
MID-CONTINENT BUILDING • FORT WORTH, TEXAS
Export Division: 45 Rockefeller Plaza, New York 20, N. Y. Cable: MIDCUMPORT NYK

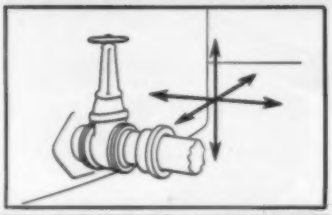
MC7-8

THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

Unlimited Flexibility!

—PROVEN IN SERVICE





Allows 6-Way Movement!

Freedom of movement in any direction is readily possible with these *ball joint* connections of 12" pipe (right) and 8" pipe (left) to 80,203 bbl. tank shown in above photo. (Photo: SHELL OIL COMPANY, Dominguez Refinery, Wilmington, Calif.)

Barco Ball Joints—

provide complete protection against

FIRE, EARTH SHOCK, TANK SETTLING

The rapidly increasing use of Barco's new large size Flexible Ball Joints in California, and other locations, is significant for several key reasons:

1. **Fire-Safe. The joints have passed rigid fire and water spray tests.**
2. **Unlimited flexibility and movement.**
3. **Long service life without maintenance.**
4. **Joints insulate against electrolysis as well as provide movement in all planes.**

Such installations protect piping, valves, and tanks from earth movements, shifts, shocks, and earthquakes. They allow for *tank settling* or *tilting* as well as for *thermal expansion* or *contraction of piping* leading to tanks without creating strain. In case of fire, the joints are "fire safe."

For detailed information, WRITE FOR CATALOG 215B. Joints available in steel with flanged or welding ends. 15° angular flex.

Sizes to 16".

PRODUCTS BACKED BY EXPERIENCE
BARCO
ANNIVERSARY
1900 60TH 1960

BARCO MANUFACTURING CO.

539M Hough Street • Barrington, Illinois

The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Rotary Joints

In Canada: The Holden Co., Ltd., Montreal

completely equipped units which include kitchens, diners, sleepers, showers, lavatories, and offices. Trailer shells can be ordered for use as workshops, radio stations, or general storage trailers, according to the bulletin. **Write or call: Elder Trailer & Body, Inc., P. O. Box 9042, Denver 16, for Air-Lift Field Trailer Bulletin.**

Combination motor starters

. . . are described in new four-page Folder 1025. The starters are water and dusttight. They feature complete accessibility and easy installation in a variety of sizes. **Write or call: Nelson Electric Mfg. Co., 4041 South Sheridan Road, Tulsa, for Bulletin 1025.**

Pocket-size slide selector

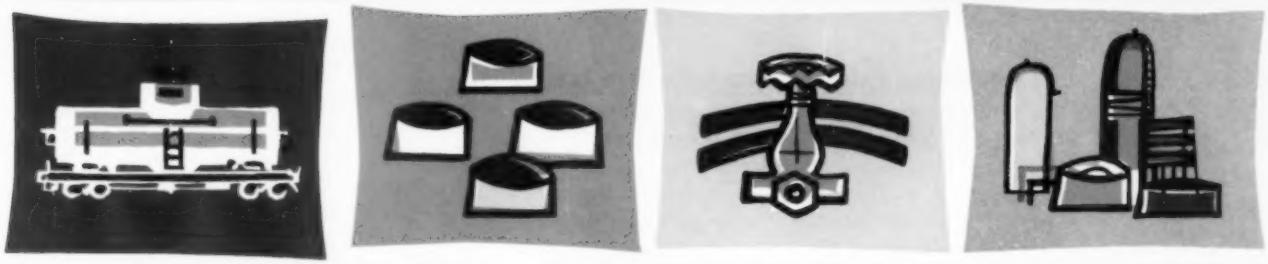
. . . for easy selection of the correct size and type of liquid-level gages and valves for any job is now available. The selector condenses a wealth of specifications, sizes, and other data in easy-to-use form. It gives size numbers, visible glass, and center-to-center connections of gages in various types and pressure groups. Other data includes individual pressure-temperature graphs on each type of gage, illustrations of various gage-valve combinations, and cross-section illustrations and data on various types of valves. **Write or call: Jerguson Gage & Valve Co., 80 Adams Street, Burlington, Mass., for free slide-selector.**

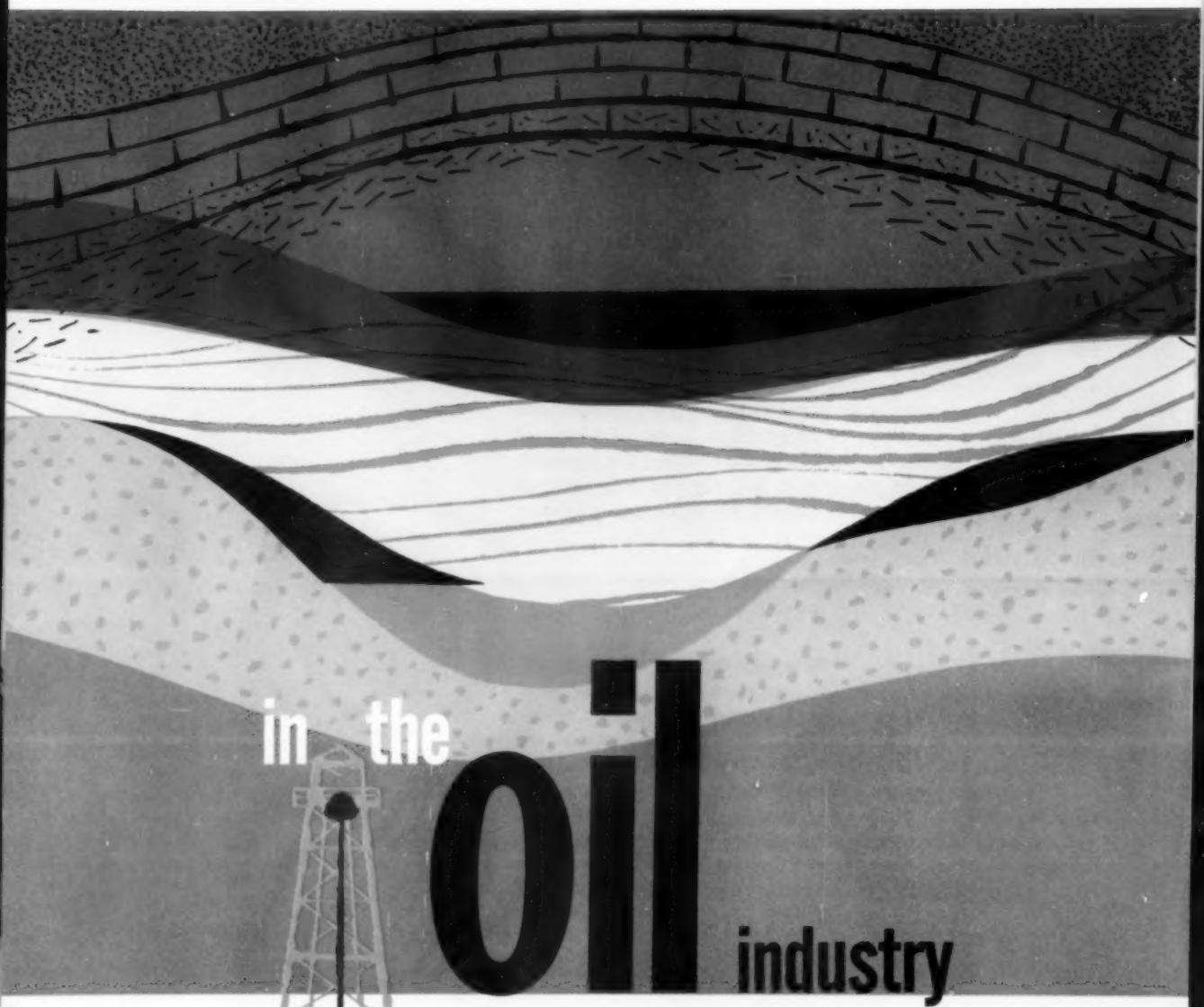
Filter control valves do two jobs

. . . in filtering operations: (1) they are used for surface wash-water applications on filters, and (2) they are used for controlling the flow of water to the filters. The valves are outlined in a new four-page folder. They are easily opened or closed from the operating table, the maker claims. The bulletin includes operating layouts, operation, construction, dimensions, and specifications. **Write or call: Golden-Anderson Valve Specialty Co., 1265 Ridge Avenue, Pittsburgh 33, for Bulletin W-17.**

Well-stimulation services

. . . including acid-treating solutions, blocking agents, and auxiliary services are detailed in a new 28-page brochure. It includes a discussion of the composition, purpose, and action of each chemical formulation, together with charts and a glossary of terms used in chemical well-stimulation work. The last chapter is concerned with water-block and emulsion-block removal agents. **Write or call: BJ Service, Inc., 6505 Paramount Boulevard, Long Beach 5, Calif., for Chemical Services from BJ Brochure.**





in the oil industry

it pays to plan with GENERAL AMERICAN

A mile-long unloading system for oil carriers—tank cars for corrosive jet fuels—quick, positive protection for valves and fittings—a Texas-size storage tank ...these are a few of the answers General American provides for problems in transporting, storing and marketing of liquids. If you require specialized service in any of these areas, you'll find it pays to plan with General American.

BUSINESS END OF A MILE LONG PIPE LINE

Double handling and expensive barging were eliminated when General American's Plate and Welding Division erected twin 268,000-barrel storage tanks for Northville Dock Co. at Long Island Terminal, N. Y. The world's largest tankers (or any tanker presently contemplated) can moor safely in 70 feet of water more than a mile offshore—deliver cargoes direct. Each of these General American custom-engineered tanks is 200 feet in diameter, 48 feet in height. Together they provide storage for 22,500,000 gallons of oil.

NOW—FOR THE OIL INDUSTRY—LARGE CAPACITY TANK CARS

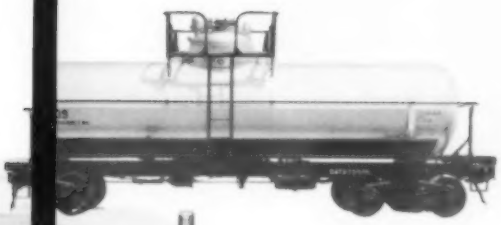
Important economies to shippers and carriers will result from a new concept of tank cars now being developed. Domeless cars of high volume capacity designed for the improved rail roadbeds of today are in the program. Prototype fleet for the petro-chemical industry now under construction is made up of domeless cars capable of carrying more than 18,000 gallons of product. Standardization in the neighborhood of 16,000, 18,000 and 20,000 gallons is proposed. When you are interested in large capacity cars, see your nearest General American representative.

NEW JOB FOR LITTLE BIG INCH!

This 1700-mile product pipe-line is in operation between Texas and General American's tank storage terminal at Chicago, Illinois. It links the world's largest refinery area with the expanding markets of the Middle West, assuring dependable, uninterrupted service. Shippers and marketers of petroleum products find the use of General American's tank storage terminal facilities can result in substantial reduction in inventory requirements and storage costs. General American provides six terminals at five key markets with more than 14,000,000-barrel capacity to serve industry.

HOW TO KEEP ALCOHOL UNDER "LOCK AND KEY"

Federal tax supervision holds producers accountable for every gallon of ethyl alcohol they place in storage. When a major producer decided to store much of his output at General American's Carteret Terminal, this accountability posed no problem, because General American assumed the burden for him. Further, he was provided with a number of important services—such as metering, blending, denaturing and packaging. All this is accomplished with accurate record-keeping that solves a difficult marketing problem—an example of the way General American can take care of your needs and utilize its terminal facilities for your requirements.



NEW TYPE TANK CARS ON DEMAND

Scientists have a habit of making demands on industry that must be met at once. Jet fuels are an example. While chemists were working out the application of such powerful liquids as fuming nitric acid, hydrazine and hydrogen peroxide to missile propulsion, General American was making tank cars to carry these fuels. Today large quantities of these propellants are moved in GATX tank cars. This is typical of the forward-looking research program at General American. General American Transportation designs, builds and leases tank cars to carry liquids that range from molasses and wine to petroleum products and corrosive chemicals.

HAMER SELECTS KANIGEN FOR LINE BLIND VALVES

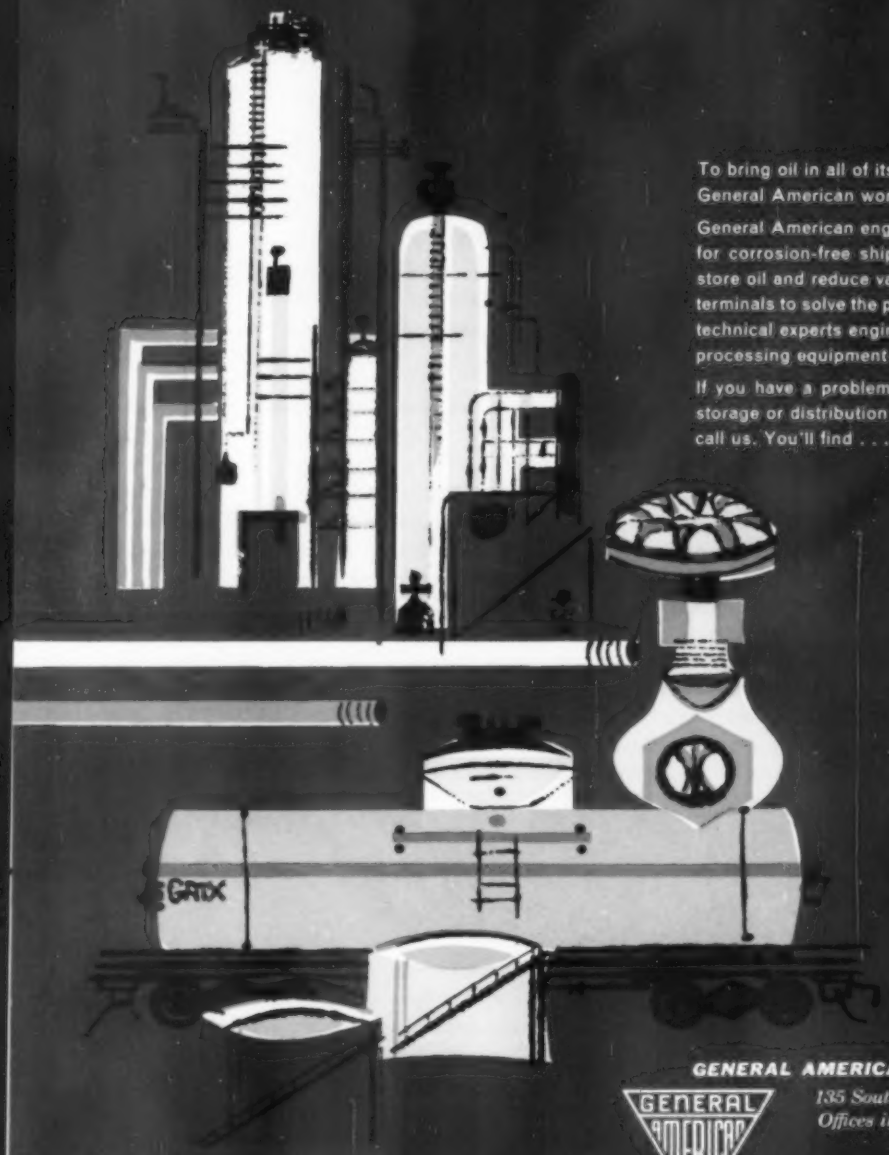
Hamer Valves, Inc. in 1936 originated the "line blind" as a means for permanent, positive shutoff in pipe lines. It provides for easy, quick one-man operation. When the line blind valve is used for corrosive liquids, quite often the protection of nickel is needed. So Hamer employs KANIGEN® nickel-alloy coating on all line blinds. "Application of the KANIGEN coating to our VISIBLE WEDGE line blind valves greatly increases the life of the valves," say the men at Hamer. You can coat anything from the inside of a 100-foot long dryer to a tiny relief valve with KANIGEN. For the "where" and "how" please use the information card.

TEXAS-SIZE STORAGE TANK

You could discharge the loaded capacity of a train of tank cars more than seven and a half miles long into Phillips Chemical Company's huge new storage tank at Cactus, Texas. Liquid is pumped into the tank (220 feet in diameter and 48 feet high) at the rate of 250 gallons a minute, yet it takes 37 days to fill its 323,000-bbl. capacity. Phillips' new tank was engineered, fabricated and erected by General American. General American has skilled crews and modern erection equipment available to facilitate construction of standard and custom storage structures anywhere in the U.S.

WHERE 45 YEARS' EXPERIENCE PAYS OFF

Forty-five years of experience are back of the design, engineering and production services of General American's Turbo-Mixer Division, and this knowledge pays off in solving any problem in this area. Whether you oxidize asphalt (Socony, Standard Ohio, etc.), or extract butadiene (Esso Standard, Polymer Corp.), or require a low-pressure polyethylene reactor (Celanese), or a continuous counter-current extraction column (Bakelite), a Turbo-Mixer can be designed for your exact needs. General American's new RDC (rotary disc contactor) liquid extractor adds high volumetric through-put efficiency to low operating cost. For information about every type of mixer or extractor, just mail information card.



To bring oil in all of its variety of forms to the consumer, General American works directly with petroleum companies.

General American engineers design new kinds of tank cars for corrosion-free shipment. Research men find new ways to store oil and reduce vapor losses. Development men build terminals to solve the problems of storage and distribution, while technical experts engineer special petroleum products processing equipment that anticipates tomorrow's needs.

If you have a problem in the processing, shipping, storage or distribution of raw materials or finished products, call us. You'll find . . .

it pays to plan with General American.

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street • Chicago 90, Illinois
Offices in all principal cities.

GENERAL AMERICAN TRANSPORTATION CORPORATION
DEPT. 1 *135 South LaSalle Street, Chicago 90*

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

Gentlemen:

Please send detailed information about the following General American Services:

- ☐ Leased facilities at General American Tank Storage Terminals
- ☐ Mixing, Drying and Process Equipment
- ☐ Wiggins Double-Deck Floating Roofs with Wiggins Safety Seal
- ☐ GATX Tank Car Leasing Service
- ☐ Custom-built Tank Cars for Special Purposes
- ☐ Gas Conservation Structures and Gas Handling Equipment
- ☐ Kanigen® Coating
- ☐ Custom Fabrication and Field Erection
- ☐ Please have a General American Engineer call for an appointment

EQUIPMENT MEN

Republic Steel Corp. acquires

... Republic Supply Co., according to T. F. Patton, president of Republic Steel. W. J. McWilliams, president of Republic Supply, and all other officers will continue in their present capacities. They are: Arthur McLawhon, financial vice president; M. N. Amsden, vice president for sales; D. L. Collins, vice president; C. J. Jump, general manager of sales; and R. J. Hood, Jr., director of purchases.

H. B. Hurley joins Welex, Inc.

H. B. Hurley

... as assistant to the president, reports Ray O. Shaffer, president. Hurley will headquarter in Houston. He was formerly with Continental Oil Co., and more recently with Republic Natural Gas Co. as senior vice president.

Homco opens servicing depot

... in Anchorage, Alaska, reports George O'Leary, president of Houston Oil Field Material Co., Inc. Under the direction of Oil Equipment, Ltd., a subsidiary of Homco, and C. L. Roach, vice president in charge of Canadian operations, the Anchorage depot is equipped with a complete line of directional tools, fishing tools, bumper jars, overshots, bumper subs, and a string of wash pipe. Roach will direct all Anchorage operations.

E. K. Litthauer vists

... the distributors in the United States for welding fittings produced by B.K.L. Ltd., Birmingham, England. Litthauer is commercial manager of B.K.L. The company is one of the largest manufacturers of welding fittings outside the United States. They are now increasing their range up to elbows as large as 24-in. and tees as large as 16-in.

Houston Chapter of Nomads hosts international guests

... at the October meeting. Standing are: Cesare Colomasi, Gulf Italia Co., Ragusa, Sicily; B. McKehon, Kuwait Oil Co. Kuwait; G. M. Mathieu, Petrofina, Luanda, Angola; and J. M. Johnson, Choca Petroleum SA, Chocabama, Bolivia. Seated are: Jack Enen, International Drilling Co., Houston; Blackie Chunn, Gulf Italia Ragusa; and Julius Massoia, Petroleo Brasirerio, Rio de Janeiro, Brazil.

R. D. Ford named president

R. D. Ford

... of Schlumberger Surenco, S. A. Ford will maintain headquarters in Caracas, Venezuela. He joined Schlumberger in 1936. He has held a number of posts in various parts of this country, including assistant area manager in California, assistant area manager for the Gulf Coast, and area manager for the Mid-Continent area.

Milwhite Mud Sales Co. reports

... two new zones in their sales and service organization, according to George E. Conner, executive vice president. The Mid-Continent zone, including Kansas, Oklahoma, North Texas, West Texas, and New Mexico, is under the supervision of Richard Ladd. He will headquarter in Tulsa. The Rocky Mountain zone, under the direction of R. J. Adamson, will service the Four Corners area up to the Canadian Rockies. Adamson was formerly in Casper Wyo., and will now headquarter in Denver, Colo.

Beacon Petroleum Co. names

R. A. McLaughlin

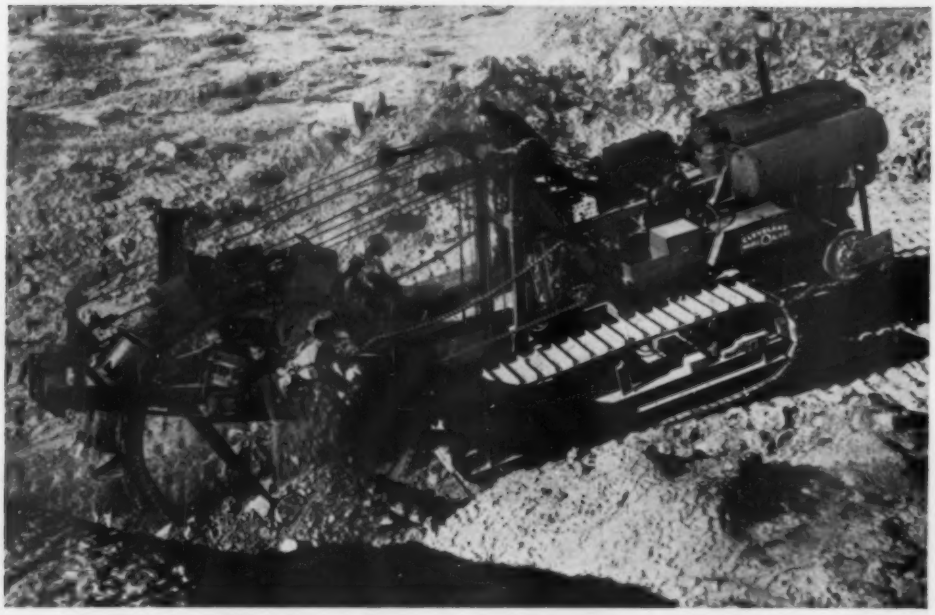
... Ralph A. McLaughlin as traffic manager, according to Jerry Feroe and Bob Bolinger. McLaughlin most recently has been with Service Petroleum Co. He has also been with Anchor Petroleum Co. and Mid-Continent Petroleum Corp. At Beacon he will head the fleet of tank car and truck transport distribution of butane-propane products.

This aerial view shows Joe Stine, Inc.'s, expanded facility

... at Houston. The manufacturing plant covers 30,000 sq. ft., with a new office combined with engineering department of some 2,600 sq. ft. Additional lathes and hydraulic equipment have been added. The company specializes in custom-made offshore hydraulic jacking devices, as well as standard oil-field specialties.

Clark Bros. Co. opens

... a new branch office in Denver, Colo., according to George W. Probst, vice president sales. Jay B. Williams has been appointed manager. This office will be devoted to the sales-engineering of Clark compressors and



THE REDWASH OIL BASIN doesn't give a trencher much to dig in except hard rock, but this Cleveland 240 is making money for its owner as it grinds out trench for a flow line in rugged terrain 30 miles east of Vernal, Utah.

Good Everywhere

The CLEVELAND TRENCHER Co. 20100 St. Clair Ave., Cleveland 17, Ohio

Oil Loans

THE 1ST NATIONAL BANK OF SHREVEPORT

ROBERT F. CASHEN — Manager Petroleum Department

HOUSTON CONTRACTING MEN OF EXPERIENCE

Build Better Pipelines

The majority of the men on Houston Contracting Company spreads—welders, cat drivers, truckers—are professional pipeliners, often with twenty to thirty years' experience. These men are YOUR guarantee of better-built pipelines.

Houston CONTRACTING COMPANY
GENERAL CONTRACTORS
Laurence R. Favret • R. P. Gregory • Geo. A. Peterkin

OIL • GAS
GASOLINE
WATER PIPELINES

5807 BUFFALO SPEEDWAY
HOUSTON 6, TEXAS

gas turbines. Williams comes to Denver from the Tulsa office where he was assistant manager.

Alan C. Roberts appointed

A. C. Roberts

. . . to manager of the newly created oil and gas section of The Fort Worth National Bank's trust department, according to Estil Vance, president. Roberts, who has been with Cities Service Oil Co. of Delaware since 1951, has served in Fort Worth the past 2 years as special representative for property acquisition in that company's land department. In his new position, he will be responsible for the supervision of all oil, gas, and other mineral interests held in the various estates managed by the trust department.

Oil Well Supply Division names

. . . John Rice as field representative at the Valleyview, Alta., store, reports W. A. Weir, Canadian area manager. H. L. Temple was appointed field representative at Pettus, Tex., according to M. F. Jones, Gulf Coast area manager. Appointed as field representative at Hobbs, N. M., is D. H. Schoonover, reports William Miskimins, Central Midwest area manager. L. H. Shaw, assistant district engineer at Farmington, N. M., transfers to Fort Morgan, Colo., according to R. L. Armstrong, Rocky Mountain area manager.

Hughes Tool Co. forms

R. R. Aulick

. . . a new product observation division within the product engineering department, according to Dr. Daniel J. Martin, vice president, engineering. R. R. Aulick heads the new division as manager. He will headquarter in Houston. Initial assignments to this division include the following regional field engineers: W. A. Kistler, Jr., to Midland, Tex.; A. G. Rollow to Oklahoma City; R. D. Jones to Wichita Falls, Tex.; R. O. Bredthauer to Houma, La.; and J. A. Kloesel, Jr., to Farmington, N. M.

Cooling tower firms merge

Dover Manufacturing Co., Independence, Mo., has recently merged with J. F. Pritchard & Co. of California, Kansas City, Mo. The composite

DELTA offers new luxury to the oil industry...

Royal Service

DC-7 FLIGHTS

with *Champagne* dinners

Here is the ultimate in luxury aloft! Three stewardesses assure unhurried, leisurely dining . . . you have a choice of Entrée on many flights . . . select your favorite beverage . . . a special airport passenger agent speeds your check-in . . . there's fast baggage handling and many other special features, all yours on Delta's superb new Royal Service Flights.

between CHICAGO • NEW ORLEANS
HAVANA • MONTEGO BAY • CARACAS

Chicago • Houston
Houston • New York
Dallas • Atlanta
Atlanta • Houston
and other cities

Call Delta or your Travel Agent

Delta AIR LINES

GENERAL OFFICES: ATLANTA AIRPORT, ATLANTA, GEORGIA

All New

FRANKS EXPLORER

THE EXPLORER is the product of FRANKS 27 years of engineering field experience and pioneering in well servicing units. The EXPLORER is all new from wheels to crown — packed with power up to 400 HP. The most powerful self-propelled servicing and workover rig available. More power to weight ratio.

It looks new because it is ALL NEW!

A GOOD CREW NATURALLY DOES FASTER, SAFER JOBS WITH **Good equipment**

EXPLORER FEATURES

- INDUSTRIAL engine — Waukesha, Cummins, GM or equivalent, up to 400 HP.
- NEW main drum design for fastest, safest pulling.
- NEW water and air cooling brake system.
- NEW hardened, removable floating brake drums.
- NEW easier, faster and safer handling controls.

WELL SERVICING AND DRILLING UNITS

FRANKS

DIVISION OF

CABOT SHOPS, INC.

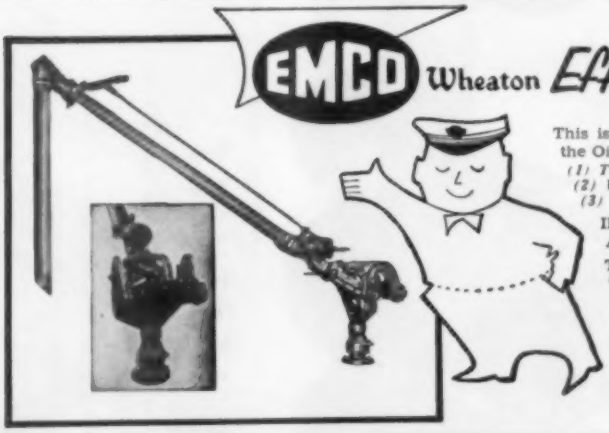
PAMPA, TEXAS

AUTOCAR PICKED FOR ANOTHER TOUGH JOB

On its way to the remote Chaco jungle oil field explorations in Paraguay, this Autocar was one of the first trucks on the job for Pure Oil Company. The six wheel drive Autocars are specially designed for rugged work in the petroleum industry and have a great reputation everywhere for dependability and performance—year after year.

It's AUTOCAR—*for extra earning power*

Autocar Division, The White Motor Company, Exton, Pa.



EMCO Wheaton *Efficient* **Fluid Handling**

This is but one of the EMCO WHEATON range of products for the Oil & Petroleum Marketing Industry, which includes:—

(1) Truck Tank Valves; Manhole Covers, and Couplings.
(2) Valves and Swing Joints.
(3) Service Station Equipment.

Illustrated is a B.600 series "Spring Balance" Master 'Loading' Assembly—Torsion Sprung.

This assembly automatically stays in the loading position. The latest development in Bulk Loading.

For our complete Catalogue write to:—

EMCO BRASS MFG. CO. LTD.
WESTWOOD, MARGATE, KENT, ENGLAND

GERMANY: Emco G.M.B.H., Allendorf, Krs. Marburg/Lahn, Germany
CANADA: Emco Ltd., London, Ontario, Canada
Licensors—Wheaton Brass Works, N. J., U.S.A.

GET YOUR DISTANCE MEASURING FAST with ROLATAPE

ONE MAN can measure faster, more, accurately with the ROLATAPE 400 Measuring Wheel. The precision 400 automatically records measurements in feet as it is rolled along—reducing risk of human error and making your measuring as easy as walking! Write today for details: ROLATAPE, Inc., 1741 14th Street, Santa Monica, California

company will operate under the Pritchard of California name. Officers of the merged firms include J. F. Pritchard, Jr., president; Karl E. Johnson, executive vice president; and P. S. Lyon, secretary-treasurer. The four major divisions of the company will be under the direction of H. R. Cohen, controller; P. A. Frohwerk, manager of research and engineering; N. W. Kelly, manager of manufacturing; and W. R. Roeyer, general sales manager. Cohen enters the Pritchard operation from Dover.

Don V. Stone named manager

D. V. Stone

. . . of the Kelley Ripper division of Crutcher - Rolfs-Cummings, Inc., reports Ken Defenbaugh, vice president and general manager. Prior to his appointment, Stone served in sales work for Caterpillar Tractor Co., and with Euclid division of General Motors Corp.

Chas. Caldwell appointed

. . . as assistant general manager of Clevite Corp., Texas division. He will retain his responsibilities as sales manager, a position he has held since 1956. Clevite is a manufacturer of geophysical instruments and electronic systems.

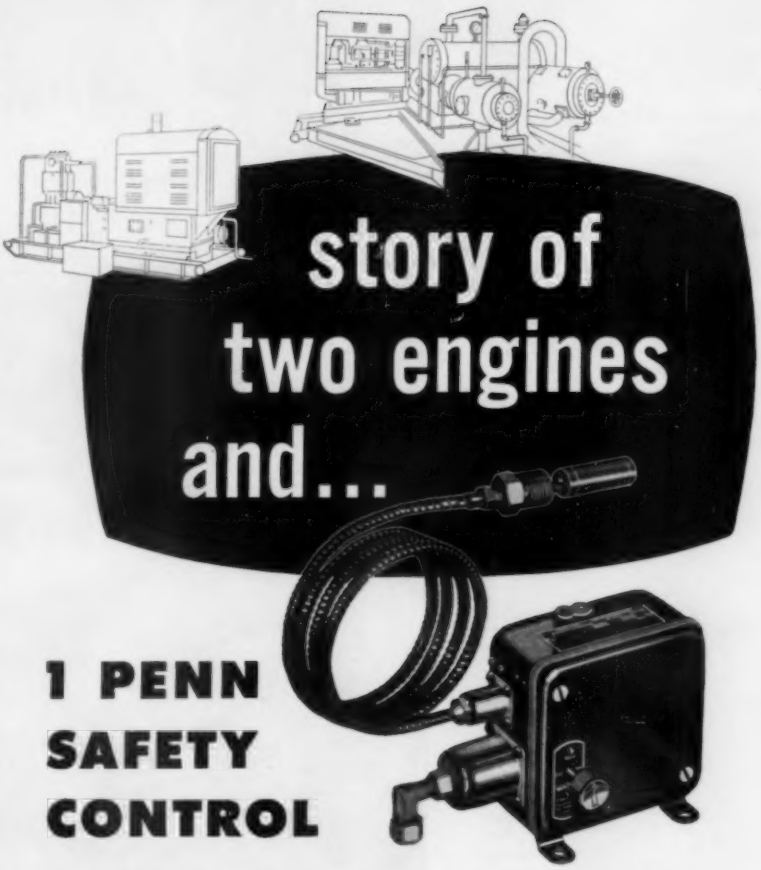
Braden Steel Corp replaces

. . . Braden Steel Corporation which will be dissolved. The new Oklahoma corporation, headed by C. W. Flint, Jr., Harold G. Lewis, and Harry N. Williams has acquired ownership and management of properties and facilities of the former company and will continue all of its sales and manufacturing activities. Harry N. Williams is managing vice president.

The new firm operating under a slight change of name, will design, sell, manufacture, and erect sectional steel and engineered-type industrial buildings, along with other fabricating activities.

J&L Steel Corp. now producing

. . . stainless steel sheets and strips at its new $17 million stainless and strip division plant in Louisville, Ohio, according to M. K. Schnurr, president of the division. The plant has an annual capacity of 36,000 tons of flat-



A damaged engine . . . lost production . . . wasted man-hours . . . an expensive repair bill! One superintendent had this expensive story to report . . . because a minor engine trouble went undetected and was allowed to grow into a major breakdown.

The other superintendent *played it safe*. A PENN Safety Control stood watch over his engine . . . ready to warn him the instant oil pressure dropped dangerously low or jacket water temperature rose too high. Little engine faults were speedily found and corrected.

You can play it safe, too! Get the full details of this efficient, low-cost protection from your local jobber or write Penn Controls, Inc., Goshen, Indiana.

TYPICAL FUNCTIONS OF PENN SAFETY CONTROLS

Battery ignition applications. Opens battery circuit and sounds an alarm . . . sounds an alarm only . . . opens battery circuit only.

Magneto ignition applications. Sounds an alarm only . . . grounds single or dual magneto . . . grounds magneto and sounds an alarm or lights a signal light.

Dual ignition applications. Opens battery circuit and grounds the magneto.

Diesel applications. Sounds an alarm only . . . closes magnetic fuel valve and sounds alarm . . . closes magnetic fuel valve only . . . closes magnetic fuel valve and opens pilot relay.

PENN CONTROLS, INC. Goshen, Indiana

EXPORT DIVISION: 27 E. 38th ST., NEW YORK, N. Y.

AUTOMATIC CONTROLS FOR HEATING, REFRIGERATION, AIR CONDITIONING, APPLIANCES, PUMPS, AIR COMPRESSORS, ENGINES

CONTINENTAL-EMSCO STORES & OFFICES

CANADA

ALBERTA
Calgary
Drayton Valley
Edmonton
Red Deer

BRITISH COLUMBIA
Dawson Creek
Fort St. John

MANITOBA
Virden

SASKATCHEWAN
Estevan
Lloydminster

VENEZUELA

Anaco
Caracas*
Las Morochas
Maracaibo

UNITED STATES

ARKANSAS
El Dorado
Magnolia

CALIFORNIA
COASTAL REGION
Santa Maria
Ventura
LOS ANGELES BASIN
Huntington Beach
Long Beach
Los Angeles*
Santa Fe Springs
SAN JOAQUIN VALLEY
Bakersfield
Coalinga
Taft

KANSAS
El Dorado
Ellinwood
Great Bend*
Liberal
Pratt
Russell
Wichita*

LOUISIANA
NORTH LOUISIANA
Jena
Shreveport
SOUTH LOUISIANA
Eunice
Harvey
Houma
Lafayette*
Lake Charles
Morgan City
Morgan City Parts Depot
New Iberia
New Orleans*
Venice

MISSISSIPPI
Laurel
Natchez

MISSOURI
Kansas City*

OHIO
Columbus*

OKLAHOMA
Ardmore*
Bartlesville*
Drumright
Duncan
Healdton
Laverne
Lindsay
Oklahoma City
Perry
Seminole
Tulsa*

TEXAS
EAST TEXAS
Carthage
Kilgore
Longview
Palestine
Tyler*
Winnsboro
NORTH and WEST CENTRAL TEXAS
Abilene
Dallas*
Fort Worth*
Graham
Nocona
Wichita Falls
SOUTH TEXAS
Alice
Freer
Luling
McAllen
San Antonio*
SOUTHWEST TEXAS
San Angelo
TEXAS GULF COAST
Corpus Christi
El Campo
Falfurrias
Houston
Refugio
Victoria
TEXAS PANHANDLE
Amarillo*
Borger
Pampa
WEST TEXAS
Andrews
Hadacol Corners
Kermit
Lubbock*
McCamey
Midland*
Monahans
Odessa
Post
Snyder
Sundown

Rocky Mountain States

COLORADO
Artesia
Denver*
Sterling

MONTANA
Billings*
Cut Bank
Glendive

NEBRASKA
Kimball

NEW MEXICO
Farmington
Hobbs
Tatum

NORTH DAKOTA
Williston

WYOMING
Casper
Cody
Newcastle

Tri-State Area

ILLINOIS
Chicago*
Salem

INDIANA
Evansville*
New Harmony

KENTUCKY
Henderson

*Office only. No stock at these points.

IT'S BEST FOR YOU TO

Specify...

CONTINENTAL-EMSCO

Specify THE ECONOMY PRODUCTION TEAM

..CONTINENTAL-EMSCO UNIT PUMPERS and SPECIALISTS

Your Continental-Emsco man sees that you get the *right* unit pumper for the job. He sees that it is *properly applied* with the right stroke length for maximum pump efficiency .. with the right strokes per minute to reduce rod failures and prevent excessive wearing of gears, belts and bearings.

Changing well conditions are easily met by C-E safe, ground-level counterbalancing .. economically done by one man. Here again, you can count on your C-E man. He weighs your wells, when necessary, to be sure you are getting maximum lifting efficiency at the lowest possible fuel or electrical cost.

For service before, during and after installation, specify Continental-Emsco unit pumpers ..

.. Equipmen

Proper Attention Guarantees Longer Life for

GREEN TRIANGLE V-BELTS

Recommendations of your C-E service man on tension, alignment and operating conditions will greatly increase belt life. His advice as to the number of belts to use assures maximum power transmission and often cuts initial costs.

Proper belt adjustment is easy with GREEN TRIANGLE V-BELTS . . sold in *matched sets.* Since each belt is identical in diameter, length, thickness, material and freshness with others in the set, adjustment for one assures uniform adjustment for all.

New York Belting and Packing Company packs Green Triangle V-belts in matched sets . . *a performance plus feature* that costs no more . . exclusively at Continental-Emsco stores.

nt that Hums

FIRST STEPS TOWARD

Specify..

HI-TEN
For Heavy Duty
in Extreme Corrosion

RELIANCE
For Heavy Loads
in Severe Corrosion

TYPE 5
For Heavy Duty
in Moderate Corrosion

HEATREAT #1 CM
For Medium
to Heavy Duty
Where Corrosion
is No Problem

CONTINENTAL-EMSCO D+B SUCKER RODS

A rod for every well condition

If your purchasing system calls for "high tensile" rods from companies A, B and C rather than specifying exact rod grades, your rod strings are costing too much.

For example, Continental-Emsco medium-priced Type 5 rod can handle the same loads of many so called "high-tensile," higher-priced rods. Why? Because, Type 5 contains VANADIUM . . the amazing element that strengthens the rod, so it has greater load-carrying capacities than rods of similar properties *without* vanadium.

Call your C-E man. Talk over your rod requirements . . well conditions. His recommendations will reduce your pumping costs by (1) matching well conditions with the *right* rod, and (2) by giving you *higher quality* for longer service.

D+B API SUCKER ROD COUPLINGS

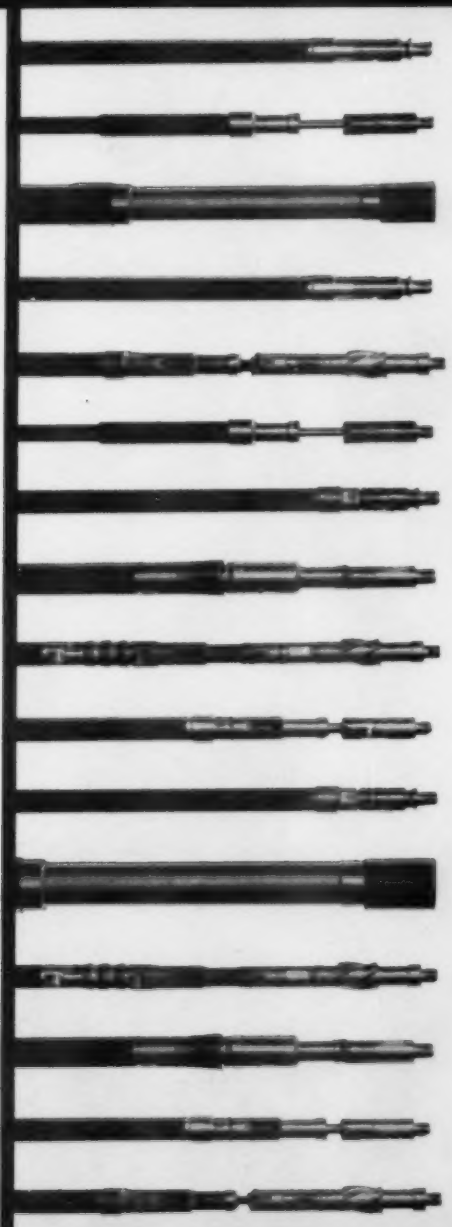
Strengthen this vital link

All Continental-Emsco sucker rod couplings are *lubrized* to protect coupling threads against corrosion and damage during make-up. These couplings are induction hardened for longer life and *100% inspected* before shipment . . to assure proper field make-up and your complete satisfaction.

for Service

RD LOWER-COST PRODUCTION

RODS



Specify..

CONTINENTAL-EMSCO
D+B SUBSURFACE PUMPS

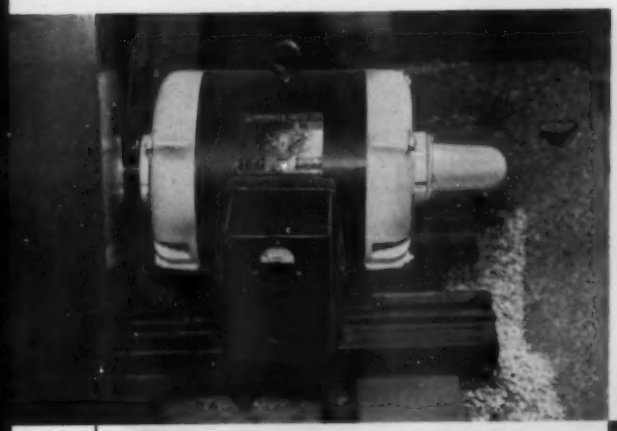
Assembled just for your well

The profit squeeze is on. No longer can you afford the luxury of *standard* pump assemblies.. often with metals of poor corrosion resistance, weak intermediate parts, or misapplication of pump materials.

Now, you need to take advantage of the full range of Continental-Emsco subsurface pumps ..37 types with over 700 variations. There's one to pump every well, efficiently and economically, regardless of depth, type of hole or corrosive, abrasive or gaseous conditions. Talk over your pump requirements with your C-E man.

Be sure to take advantage of C-E subsurface pump repair shops.. located in producing fields everywhere.

e that Sings..



Specify..

BIG ITEMS . . or small

Each Continental-Emsco store is individually stocked to meet the requirements of localized fields, so regardless of your lease location, you'll find all the items needed to do a better pumping job. Specialists are readily available to advise you on well-maintenance problems . . how to keep your production costs in line.

Specify..

C-E GREEN TRIANGLE ELECTRIC MOTORS . .

they're replacing many higher rated motors

After taking a close look, many major companies are standardizing on C-E GREEN TRIANGLE ELECTRIC PUMPING MOTORS. Here's why. They have a 40° C. rise and a *guaranteed 1.15 service factor* to handle unanticipated power demands. Their 5-8% slip and 275% starting torque reduce peak electrical loads. An exclusive *built-in* balance meter cuts well maintenance costs by making it easy to balance your wells . . see that they stay in balance. Rods and unit pumper are not vibrated apart as when pumping with an unbalanced well load.

This motor fits your pumping needs . . will cut your production costs. It's *oil field* tough . . *oil field* proven . . with Continental-Emsco *dependability* built-in.

Learn to rely upon your C-E stores for lower-cost production . . and

for equipment that hums . . service that sings.

CONTINENTAL-EMSCO

Serving the Oil and Gas Industries ... Worldwide

PB24

CONTINENTAL-EMSCO COMPANY • A Division of The Youngstown Sheet and Tube Company • General Offices: Dallas, Texas
Export Division: 48 Rockefeller Plaza, New York, N. Y. • Continental-Emsco Company Limited • General Offices: Calgary, Alberta, Canada
Continental-Emsco Company C. A., Caracas, Venezuela • Plants: Los Angeles • Houston • Garland, Texas • St. Albans, Herts., England
Representatives in All Principal Oil Fields of the World

..Go CONTINENTAL-EMSCO

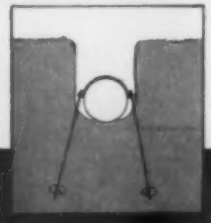
Check these advantages and you'll install

Chance PIPELINE Anchors

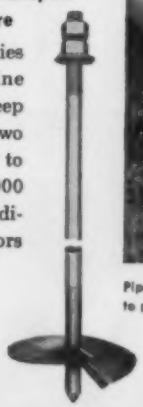
- Costs 85% less
- Easier to install
- Less weight to transport
- Less bulk to store

More and more progressive pipeline companies and contractors are turning to Chance Pipeline Anchors to eliminate costly counter weights to keep pipe from floating. A complete unit, consisting of two anchors and pipe saddle bracket, weighs from 29 to 180 pounds and will hold from 5,000 to 30,000 pounds. The anchors can be installed without additional excavation. Light power tools screw the anchors down in seconds.

Pipeline crew installing Chance Pipeline Anchors to prevent floatation problems in British Columbia.



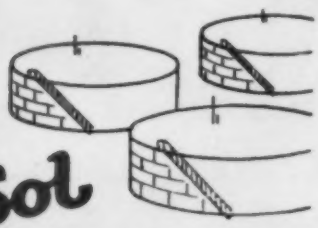
Cut away view of anchors and bracket installed in trench.



Write for complete catalog and application information.

A·B·CHANCE CO. CENTRALIA, MISSOURI TORONTO, ONTARIO, CANADA

RECLAIM TANK BOTTOMS with BrakeSol



the most effective chemical for treating

PARAFFIN

The money you make on reclaimed tank bottoms by using BRAKESOL will be substantially more than the cost of treating . . . including chemical and labor. Safe for use in production, pipeline and refinery equipment . . . Contains no chlorides, sulphides or other halides. BRAKESOL Treating Engineers have the experience and know-how to do a successful job. Contact them now!

TREATING ENGINEERS AVAILABLE AT THESE LOCATIONS

Ardmore, Okla. 6489
Carmi, Illinois 5948
Ft. Morgan, Colo. UN 7-2235
Houston, Texas HO 5-6648
Kilgore, Texas 3210
Lovington, N. M. 6-6881
New Iberia, La. EM 4-0361
Odessa, Texas EM 6-4511
Pratt, Kansas GR 2-3745
Edmonton, Alberta 66-6950
Shreveport, La. 8-1962
Okla. City, Okla. VI 3-6629 WH 9-3854 Or Call Your Supply Store

BrakeSol INC.

P. O. BOX 9506 • OKLAHOMA CITY, OKLA.
EXPORT DISTRIBUTOR THE NATIONAL SUPPLY CO. EXPORT DIVISION

TRERICE

PATENTED STEAM TRAPS HAVE A ROTATING VALVE . . . ASSURING NO LEAKAGE DUE TO WIRE DRAWING

IT ROTATES

With every discharge, the valve in a Trerice trap seats in a different position . . . a new seat . . . a steam tight seat every time! Discharging water impinges on the impeller . . . causes rotating action.

EASIER MAINTENANCE

A Trerice trap can be inspected and cleaned without removing it from the line, or disturbing the high pressure bolts and gasket. Removable cap permits quick access to valve and seat for inspection and maintenance.

FREE TRIAL OFFER

We'll supply one, a dozen, or more Trerice steam traps for your operation on a FREE 60-day trial basis. Act now! Write today for bulletin 1400D containing complete engineering data, valve and orifice charts.

H. O. TRERICE CO. 1400-D West Lafayette Blvd., Detroit 16, Mich.
Sales Offices in Principal Cities of U.S.A. and Canada

rolled stainless steel. This mill is capable of rolling stainless sheets in thicknesses ranging from ⅜-in. to 0.003-in.

The National Supply Co. names ... Louis J. Prior as traffic manager, machinery division; and William T. Hoffman as traffic manager, tubular

L. J. Prior

W. T. Hoffman

division. In their new positions, these men will divide the responsibilities formerly held by John N. Lind. Prior joined National Supply at its Todelo plant in 1921. Hoffman started at the Ambridge plant of the Spang-Chalfant division in 1930.

Dragon Engineering Co. expands ... its organization into a new plant located in Norwalk, Calif., only a few minutes from the major industrial areas of Los Angeles. Dragon Engineering has been developing and manufacturing precision needle valves and associated components which are used in the chemical industries since 1945.

Cooper-Bessemer Corp. appoints ... Freeman A. Gehres to the position of branch office manager in New Orleans, reports George W. Edick, domestic division sales manager. Gehres has been serving as assistant branch manager. He joined Cooper-Bessemer in 1939. Also appointed are W. J. Burkstaller and G. D. Adams to the New Orleans field office. Burkstaller assumes the duties of sales engineer for the application of centrifugal and reciprocating compressors. Adams will assist in engineering and sales relative to the application of centrifugal and reciprocating compressors for chemical and processing industries in the Louisiana area.

F. A. Gehres

Gardner-Denver Co. plans ... to combine into its operations Mayhew Machine Co., Inc., and Mayhew Supply Co., Inc., both of Dallas, Tex., according to a joint announcement from G. V. Leece, presi-

A 6000#/24 hr. capacity W&T chlorinator is used on the central cooling water system at Marcus Hook, Penna. refinery of Sinclair Refining Company.

W & T CHLORINATION ...

the economical way to prevent slime in cooling waters

Water used for cooling operations at the Marcus Hook refinery of Sinclair Refining Company is chlorinated to prevent slimes from fouling plant units and lowering cooling efficiency.

Chlorination of the system is accomplished by one W&T chlorinator operated from a program control panel. The control automatically starts and stops chlorination in accordance with a preselected schedule. Slime growths are eliminated in the cooling units without the need for continuous treatment.

For information about W&T chlorination for slime elimination write for Bulletin CD-43.66.

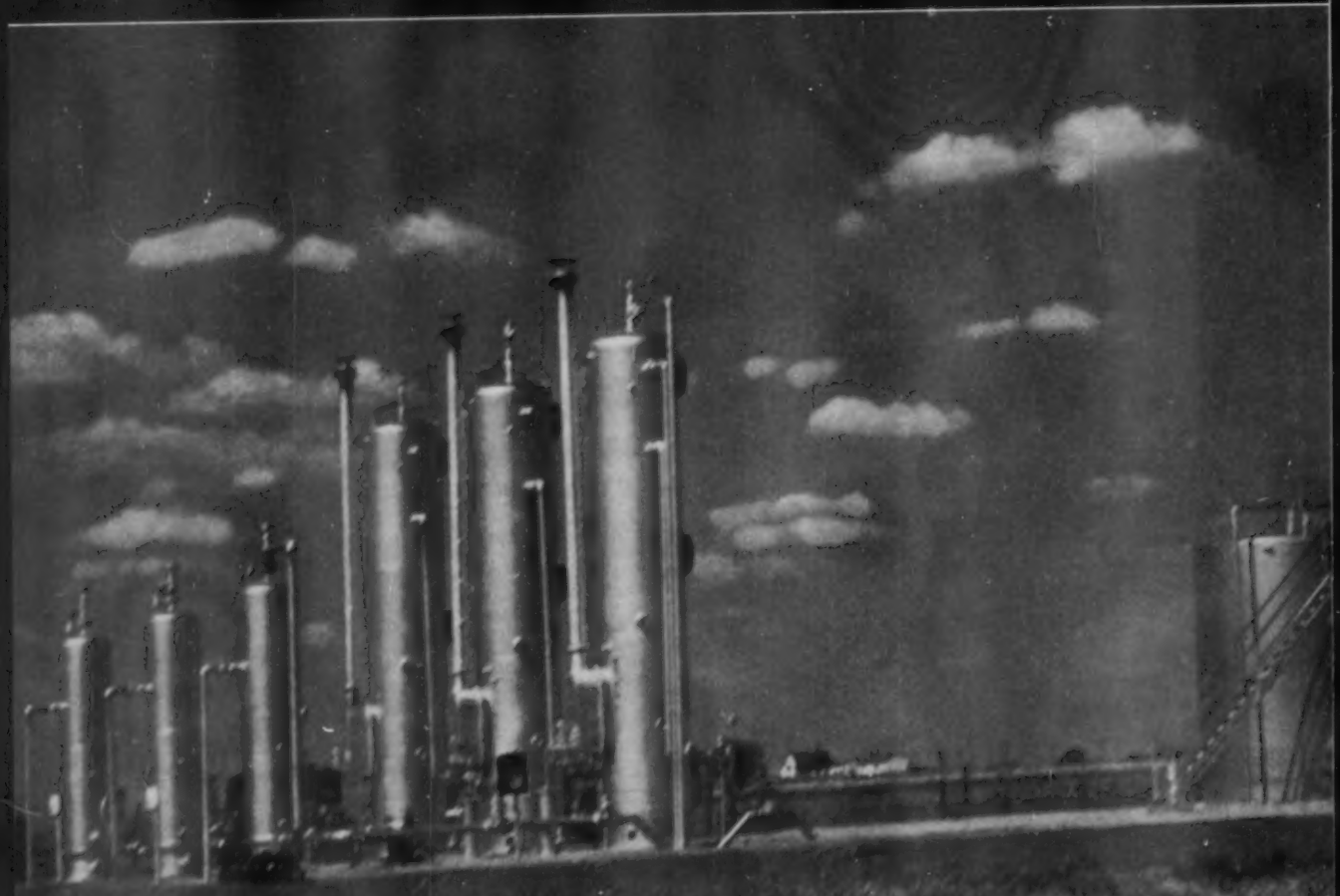
WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

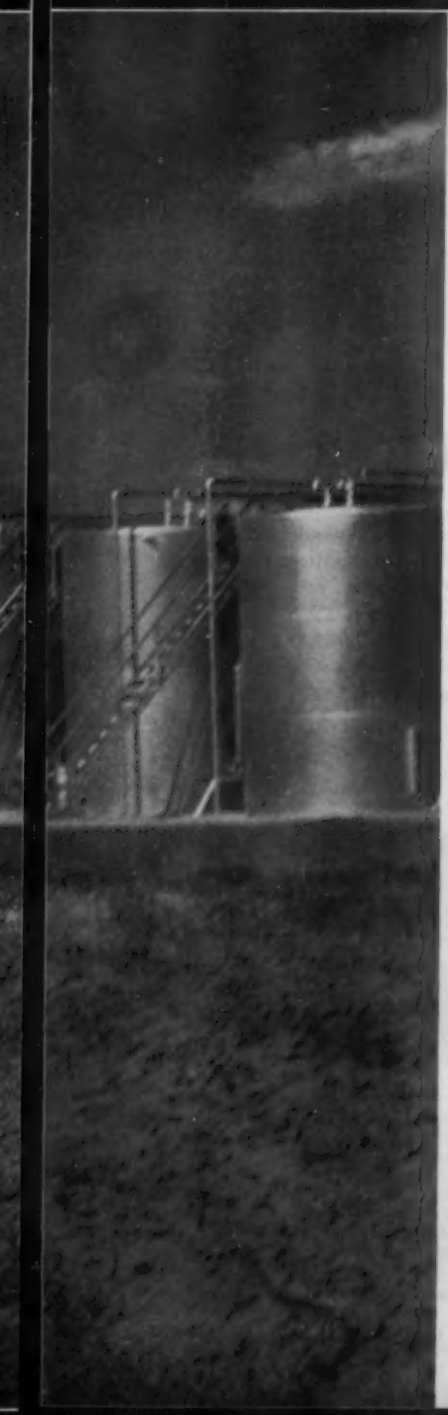
ELECTRO RUST-PROOFING CORPORATION

30 MAIN STREET, BELLEVILLE 9, N. J.

Now...J&L adds



Continental Tanks!



Leasehold storage and processing equipment manufactured by **Continental Tank Company** of Oklahoma City, Oklahoma, is now available from **Jones & Laughlin Supply Division.**

Continental Tank offers a complete line of tanks and related equipment for the producer.

J&L can now provide customers with the **most complete production package** available to the oil and gas industry. For all requirements, from bottom hole pumps and sucker rods through tubing and casing to pumping units, tank batteries and lease processing equipment it's J&L all the way.

Distribution of **Continental Tank Company** products in the United States, Canada and overseas assures complete service to the oil and gas industry by the supply house that leads the field with quality.

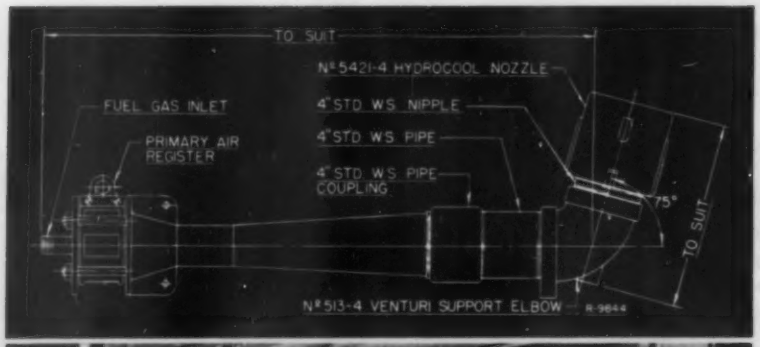
Literature, information and prices are waiting for your call at any J&L store or office.

Buy from J&L and you buy the "best available."

Continental Tank Co.
BOX 5038 FARLEY STATION
OKLAHOMA CITY, OKLAHOMA

Jones & Laughlin
SUPPLY DIVISION – Tulsa

If it's sold by J&L....
It's the best available



Firing Hydrogen

IN A CENTER WALL UP-DRAFT FURNACE

The HYDROCOOL Burner-Nozzle was developed and is manufactured solely by National Airoil Burner Company. It provides safe operation with Hydrogen or Hydrogen rich gas fuels in any type of petroleum or chemical furnace. It will also efficiently burn any other gas, such as natural or by-product types.

As compared with the conventional natural or refinery gas burner nozzle, the HYDROCOOL will produce a short, hot, stable flame with a high turn-down ratio, and with extremely low excess air at the nozzle.

HYDROCOOL Burner-Nozzles have been in continuous large scale commercial use in oil refineries throughout the United States, Europe and the Near East.

HYDROCOOL Nozzles have frequently been used as replacements for our Airocool Nozzles, as well as other makes of nozzles where the previously high density gas has been replaced by Hydrogen.

Write us for further information — and please use your Business Letterhead.

National Airoil
BURNER COMPANY, INC.
Main Office & Factory: 1236 EAST SEDGLEY AVE., PHILADELPHIA 34, PA.
SOUTHWESTERN DIVISION, 2512 SOUTH BOULEVARD, HOUSTON 6, TEXAS

PRECISION MAKES THE SPARKS FLY!

Closely controlled lengths—that's one more advantage CWPM gives you. Accuracy of cut is ensured by a flying cut-off saw which travels with the moving pipe. Just another reason why CWPM pipes are of such unvarying fine quality. Write for our latest specification catalogue.

CANADIAN WESTERN PIPE MILLS LIMITED
PORT MOODY, B. C.
Telephone: WEbster 9-1131
Branch: Calgary, Alberta
Telephone: AMherst 2-9389

8-132

dent of Gardner-Denver, and H. W. Mayhew, Sr., chairman of the board of Mayhew. The proposed acquisitions will be effected by an exchange of Gardner-Denver common stock for all the stock of the Mayhew companies. Executives of Mayhew will continue to head the Mayhew operations. Mayhew will be represented on the Gardner-Denver board of directors.

B & W, Inc., opens

. . . a new warehouse and service center in Morgan City, La. This warehouse will provide prompt delivery and installation of B & W scratchers, centralizers, and holding devices to barge, offshore, and land well locations in the South Central Louisiana area. It will be under the supervision of J. L. Felts, eastern district manager.

Sooner Pipe & Supply plans

. . . the opening of a new oil-field supply store at Perryton, Tex., according to P. B. Martin, sales manager, Sooner Pipe & Supply Corp. R. L. Pickens, previously at the store in Pawhuska, Okla., will serve as store manager.

Donald F. Wishart named

. . . engineering manager of Stone & Webster Engineering N.V., recently formed subsidiary in the Netherlands. He has been chief project engineer of the chemical division of Stone & Webster Engineering Corp. in Boston.

Stan Cook returns to Calgary

. . . after having spent the greater part of the summer months in the home office of Le Grand Sutcliff & Gell in Britain. Cook is general manager and vice president, sales, for Le Grand Ltd., Canadian subsidiary of Le Grand Sutcliff & Gell, British manufacturer of oil field equipment. Headquarters of the branch company in Canada is at Calgary, Alta., and sales activities cover all oil country in western Canada.

W. G. Deutsch joins

. . . Instruments, Inc., as factory engineering representative to serve the Chicago area. Prior to joining Instruments, he was employed by Panellit, Inc. Previous to that, he was with General Electric Co.

Wm. Cameron & Co. markets

. . . drilling muds and chemicals under private label, CAM-MUD, reports

New film on corrosion

. . . prepared by Amercoat Corp. tells what causes anodes and cathodes to form on steel surfaces, how they produce electrolytic corrosion, and what can be done about it. It discusses inhibitors, alloys, hot-dip galvanizing, cathodic protection, metallizing, organic coatings, and Dimecote inorganic zinc coating as shown above. For showing write Amercoat Corp., 4809 Firestone Blvd., South Gate, Calif.

From broad planning to detailed execution -- Pipe Line Technologists offer experienced counsel on every phase of pipe line activity.
PL
TECHNOLOGISTS
PIPE LINE TECHNOLOGISTS, INC.
CRUDE OIL • NATURAL GAS • PRODUCTS PIPE LINES
HOME OFFICE:
3431 WEST ALABAMA • P. O. BOX 22146 • HOUSTON 27, TEXAS • PHONE JAckson 6-3221
BRANCH OFFICES:
80 BROAD STREET, NEW YORK, NEW YORK • PHONE DIgby 4-1949
209 ROYALITE BUILDING, CALGARY, ALBERTA, CANADA • PHONE AMherst 6-6809
MARACAIBO, VENEZUELA

F. R. Weddington, president. Cameron has been in the mud supply business for more than 31 years handling products under various brand names.

Name change announced

Southwestern Gas & Electric Co. has changed its name to Southwestern Electric Power Co., according to J. Robert Welsh, president. For the past 15 years the company has been solely in the electric service business. The last gas distribution property was sold in 1943. The change was made to more clearly define the service of the company.

The Harco Corp. moves

. . . into new headquarters in Cleveland, Ohio, according to Harry W. Hosford, Jr., president. The combined executive offices and manufacturing facilities are more than five times those formerly occupied by the company and include shipping docks and a railroad siding.

Aeroquip Corp. has open house

. . . at its new plant in Dallas, Tex. The plant, which opened in August, serves Aeroquip industrial and aircraft customers in the Southwest. Manager of the plant is Clyde Stratton. Roger Leuba, formerly of the engineering department at the Jackson, Mich., plant, directs the plant's aircraft operations.

Crosby Valve & Gage Co. elects

. . . J. J. Bresnahan as vice president in charge of sales and appoints G. H. Christen as sales manager of western districts, according to Erling Klafstad, president. Bresnahan joined Crosby in 1916. He was manager of safety-relief valve and pressure indicating gage sales. Christen formerly was manager of the Los Angeles office.

J. J. Bresnahan

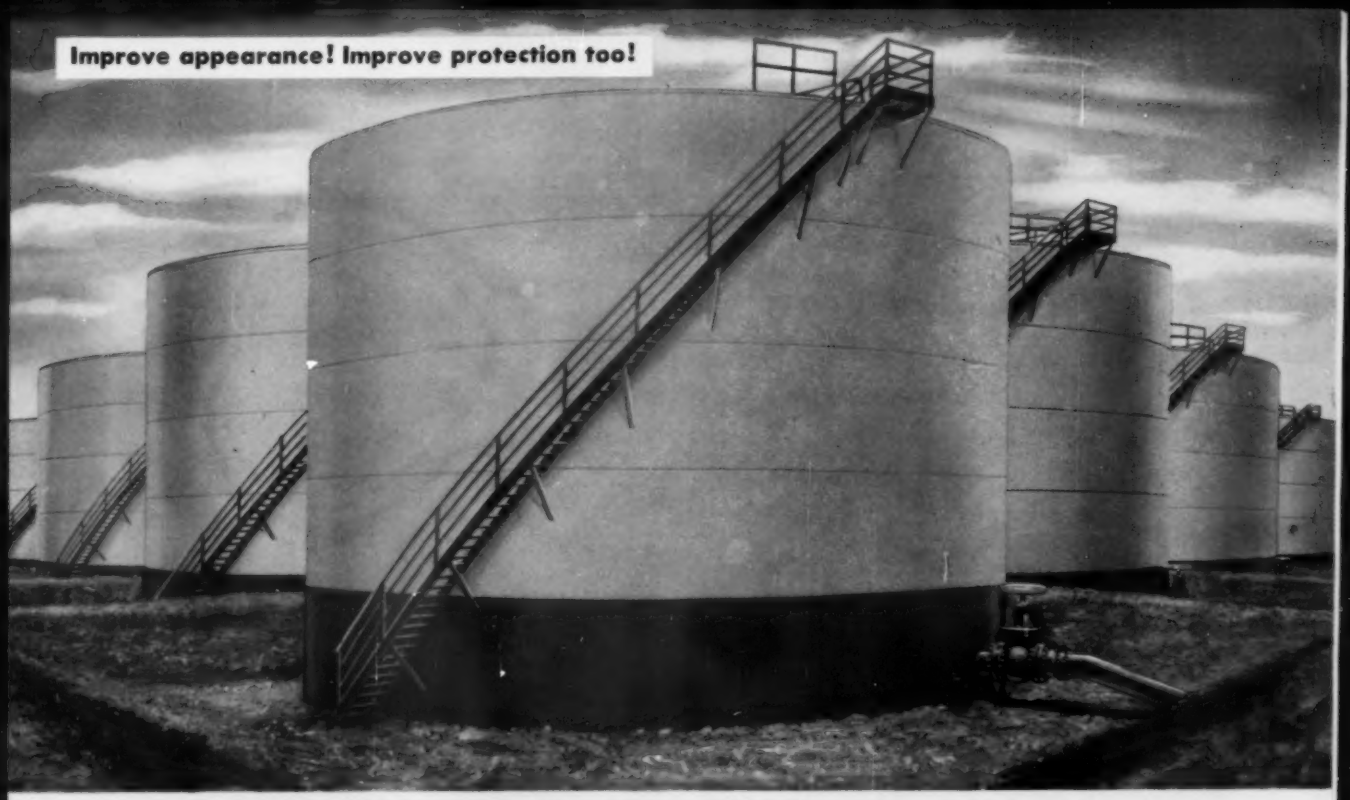
G. H. Christen

Lloyd G. Fox elected

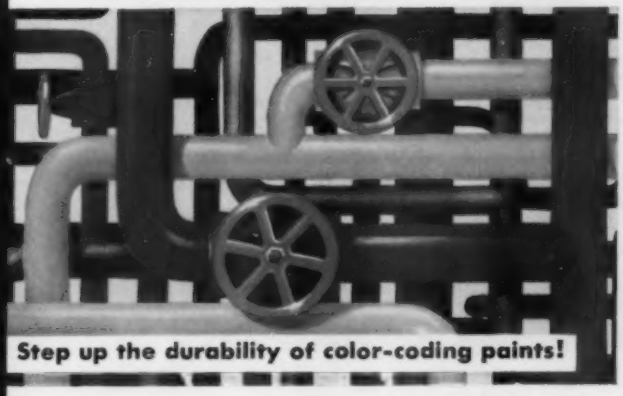
. . . to the post of vice chairman in the pipe and tube section of the Copper & Brass Research Association. He is manager of product sales for Wolverine Tube, division of Calumet & Hecla, Inc. He has been with Wolverine in various sales capacities for the last 19 years. His membership in CABRA dates back to 1952.

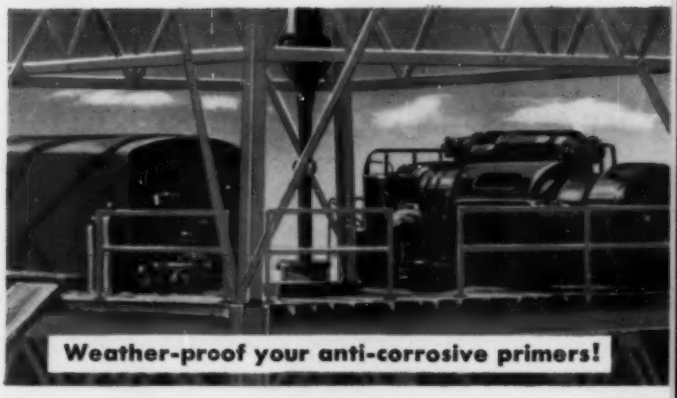
First B-134 mast raised

. . . at Societe Nationale de Materiel pour la Recherce et l'Exploitation du Petrole's Bandet Donon Rousseel plant in Blanc Misseron, France. This mast was built under license agreement with Continental-Emsco Co. of Dallas, Tex. The B-134 is an open-faced mast with 830,000 lb. nominal gross capacity. It has a clear working height of 134 ft. and is capable of handling trebles in 90 ft. stands.



NEW! M50 Defense in Depth paints!





Now metal protection that goes beyond all former concepts! For looks! For durability!

Now... with **M50*** Basic Lead Silico Chromate pigment, an astounding development of National Lead Company Research . . . makers of anti-corrosive paints can put in your hands one-, two-, or three-coat formulations with the following never-before combination of properties in *any* or *all* coats:

1. **Rust inhibition of highest primer quality**
2. **Weather resistance of superior topcoat quality**
3. **Your choice of colors from a wide selection**

See proof that these new Defense in Depth paints are unique for looks, unique for durability. ➡ ➡ ➡

*Registered trademark **National Lead Company**. *General Offices:* **111 Broadway, N. Y. 6, N. Y.**

New M50 one-coat protection

Typical single all-purpose coat . . . a combination in one coat of M50 rust inhibition, weather resistance and color retention.

RUST INHIBITION IN ANY and ALL COATS

Each coat contains 20% to 40% by volume of rust-inhibiting pigment . . . more than many primers.

WEATHER RESISTANCE IN ANY and ALL COATS

Unlike other rust inhibitors, insoluble M50 pigment boosts weather resistance . . . aids tint retention.

One coat (2.0 mils dry film) on rusted, mill-scaled steel exposed 45°S 12 months in industrial atmosphere and 12 more months in normal atmosphere. Paints formulated for equal PV.

TYPICAL M50 COLORS

The differences that make a difference

Idealized M50 pigment particle

Coated

Idealized conventional pigment particle

Solid

With *M50* pigment, paint makers can now provide anti-corrosive performance far beyond all previous concepts for paints selling at current market levels.

Diagram above shows *one* unique difference that makes this possible... the surface location of the business portion of the *M50* pigment particle. In this location, *all* of the reactive agent that produces rust-inhibiting, durable paint coats is available to react.

Another *unique* difference is that the reactive agent... basic lead chromate... is fused. Basic lead chromate is known for exceptional rust inhibition. Fused, it has, as well, superior weather resistance and tint retention.

Everything you want can be obtained with

Here is proof... spread out for your consideration... that *M50** pigment *Defense in Depth* paints are a new, more effective, more versatile means than ever before available, of protecting steel against atmospheric corrosion.

Look, first, at the large chart above. Top row shows the amount by volume of rust-inhibiting *M50* pigment in *each dried paint coat* in three typical metal-protective types of coating. Each paint has a higher content of rust-inhibitive pigment than many primers.

Each paint has outstanding weather resistance, too! Second row in chart gives photographic proof that *M50* pigment *primers, intermediates and finishes* are all more resistant to weather than most topcoats. They're resistant to industrial atmospheres, too. And you have your choice of colors from a large selection.

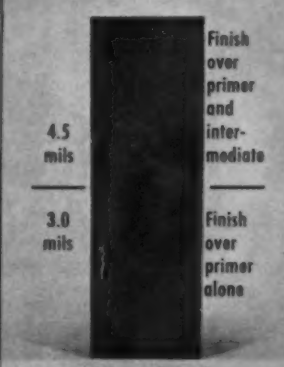
Each paint made with M50 pigment provides these benefits in higher degree than all paints combined of many other systems. *M50* paints can be formulated for application by brush, roller or spray.

New M50 two-coat protection

Typical two-coat application . . . combining M50 rust inhibition, weather resistance and color retention in each coat.

No visible splotching!

Typical M50 pigment paint, exposed 4 years in industrial area adjacent to oil refinery. Left, on rusted surface with retained mill scale. Right, on clean, sand-blasted surface.

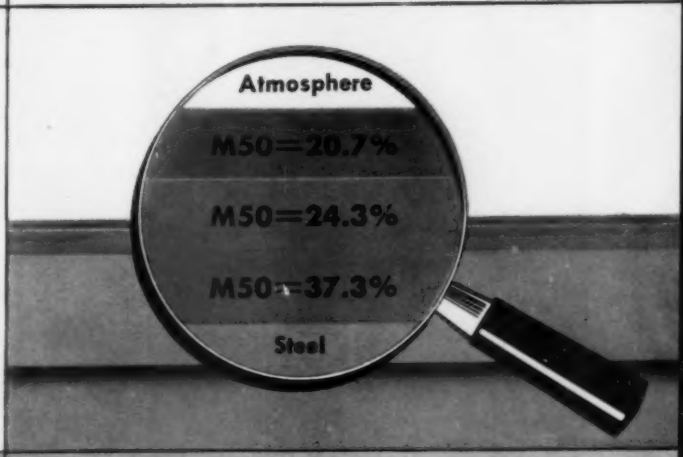


No visible color change!

M50 pigment paint exposed 2 years, 45°S. in normal atmosphere. Insolubility and stability of M50 fused lead chromate pigment promotes color retention.

New M50 three-coat protection

Typical three-coat application . . . combines rust inhibition, weather resistance and color retention in all coats.



2 standard pigment alkyd primer coats
1 standard pigment alkyd primer coat
Gray Alkyd Finish Coat
2 M50 pigment alkyd primer coats
1 M50 pigment alkyd primer coat

After 9 years exposure, even the 1.5 mil M50 primer coat (right bottom) is still in place, still actively resisting corrosion.

in anti-corrosive paint the use of M50 pigment

Any paint maker can supply you.

National Lead Company has made available to paint makers pertinent conclusions of the 20 years research that lies behind the *M50* pigment particle and the 10 years of exposure testing that lies behind *M50* pigment Defense in Depth paints. With this data, your regular suppliers can make up super-performance *M50* pigment Defense in Depth paints to your specification. Next time you purchase, call for bids on paints made to *M50* pigment specifications.

*Registered trademark

National Lead Company
111 Broadway, New York 6, N. Y.

Gentlemen: Please send me your literature describing and giving formulations of *M50* pigment anti-corrosive industrial paints. Send also your booklet "Defense in Depth."

Name_____ Title_____

Firm or Dept._____

Address_____

City_____ State_____

Each reservoir fluid has its own unique characteristics. The sooner these critical pressure-volume-temperature data are pinned down and understood, the sooner an operator can take a more tangible look into the economic future.

He needs this P-V-T information for estimating the quantity of stock tank oil in place, the amount he may expect to recover, and the field procedures best suited to sustain the reservoir's optimum productive ability.

But major changes in the properties of reservoir fluids occur as the field is produced and pressure declines. Therefore, the most effective recommendations and predictions are made from analyses of subsurface or recombination samples obtained *early in the life of key wells.*

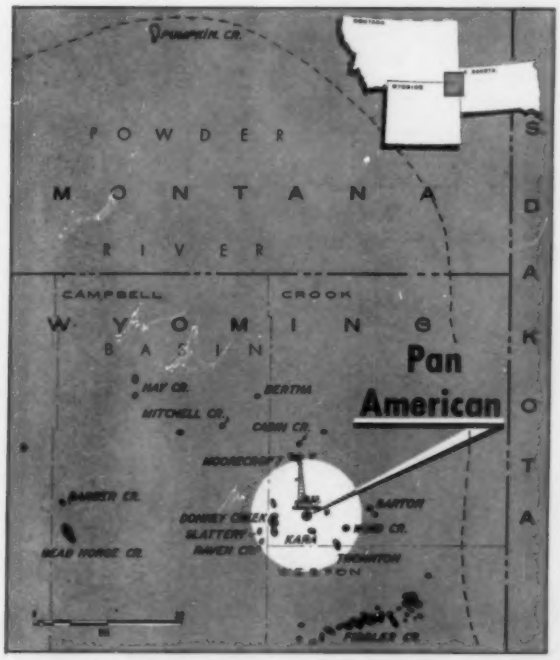
Core Lab, operating the industry's largest and most modern commercial reservoir fluid laboratory, has blueprinted the long-range recovery patterns of, not hundreds, but thousands of different producing horizons. This experience factor is added to the data you receive.

Beat your future to the draw. Act *now*. It's never too early — but it can get too late.

CORE LABORATORIES, INC.
801 CORE STREET DALLAS 7 TEXAS

CORE LAB

DALLAS FT WORTH HOUSTON MIDLAND ABILENE SAN ANGELO PAMPA AMARILLO MONAHANS LUBBOCK HOBBS CORPUS CHRISTI VICTORIA M-ALLEN SAN ANTONIO SHREVEPORT TYLER EL DORADO HATTIESBURG JACKSON TULSA OKLAHOMA CITY WICHITA FALLS BARTLESVILLE WICHITA LIBERAL LAFAYETTE NEW ORLEANS DENVER STERLING CRAIG CASPER WORLAND KIMBALL WILLISTON FARMINGTON LOS ANGELES BAKERSFIELD LONG BEACH CALGARY EDMONTON REGINA VENEZUELA S A



A NEW DISCOVERY in Crook County, Wyoming, may emerge as the top oil discovery story in Wyoming this year. Pan American Petroleum Corp. 1 Robinson has yielded excellent oil recoveries on two of four drill-stem tests.

Powder River stages repeat performance

BY FRANK J. GARDNER

ONE OF WYOMING'S biggest news stories in 1957 sprouted at Crook County's Donkey Creek field. This was the discovery of Minnelusa-Pennsylvanian oil at 7,727-37 ft.; previously, this had been a shallow Cretaceous field, with production coming from the Newcastle and Dakota sands at 6,100-6,200 ft. The new pay opener, True Oil Co. B-6 Burrows (Section 8-49n-68w), potentialed for 672 bbl. of 32°-gravity oil on a ¾-in. choke.

A repeat performance . . . This year, the story is repeating itself, only 6 miles east of Donkey Creek. At its 1 Robinson (Section 32-50n-67w), Pan American Petroleum Corp. has reported a couple of drill-stem tests that definitely indicate one of the most important strikes in Wyoming for 1958.

So far, four tests have been run at the 1 Robinson, all in Minnelusa sand. The first, at 5,998-6,080 ft., recovered only mud. But the second, at 6,045-89 ft., recovered 4,894 ft. of black, slightly gas-cut oil plus 248 ft. of oil-cut mud in 1 hour; there was no water. The third test at 6,089-6,111 ft. recovered 3,630 ft. of oil, 623 ft. of slightly water-cut oil, 712 ft. of sand-cut oil, and 766 ft. of clear water. A fourth test recovered oil-cut water at 6,110-69 ft. Pan American is taking the well on down and is at the 6,500-ft. level at this writing. Originally, it was a 6,400-ft. contract.

Means new hope . . . Operators in this eastern Powder River basin have always had water troubles in the Minnelusa. Prior to the Donkey Creek discovery in 1957, two other Minnelusa hits had been completed, produced, and abandoned. These were at Adon and Mitchell Creek fields, both in Campbell County, just west of Crook. Upon completion of the Donkey Creek Minnelusa well, this column stated that "It is to be hoped that Donkey Creek will provide the necessary clues to development of sustained deep Pennsylvanian production on this eastern flank of Powder River" (OGJ, 6/10/57, p. 171). But that discovery well and later development wells also began cutting a high percentage of water. The tests at the new Robinson discovery hint that Pan American is due to have the same kind of trouble with old man water. But again, we can hope.

In deeper sands . . . These Pennsylvanian tests are among the first to probe beneath the Cretaceous in eastern Powder River. The successes and semi-successes so far registered certainly indicate a future crop of pre-Cretaceous fields for the basin. But by and large, they will be stratigraphic accumulations, hard to find and, evidently, hard to produce.

The exploratory emphasis in recent years here has been on near-random drilling in a search for Mesaverde sand pinchouts. The seismograph has been used a great deal, but it hasn't helped much in the stratigraphic-trap hunt. Wyoming geologists believe though, that they are making progress in strat-trap definition. In the June 1958 issue of the AAPG Bulletin, the following optimistic opinion is found:

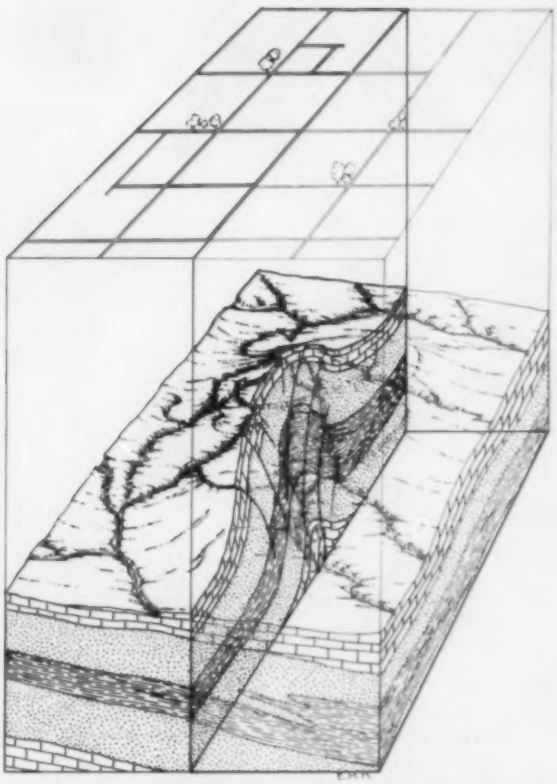
"The trend of exploration in Wyoming during the year 1957 has been one of continued deemphasis of structural definition and drilling and an emphasis on stratigraphic exploration. A continued decrease in seismic activity has been offset by an increase in exploratory drilling. Exploratory drilling success ratio increased over the 1956 ratio, indicating that although stratigraphic-type accumulations are hard to find, they will ultimately reach approximately the same success ratio over-all, as structural accumulations. This is believed to be due to the experience and techniques derived by the industry as more concentration of effort is allotted to the finding of stratigraphic pools".

This is an important turn of events. For it represents a change in the state of mind among Rocky Mountain oil finders. The sooner other regions fall in line, the better. Our future oil fields must and will be found in the strat traps so cleverly hidden away in Mother Nature's sand pile. Structure won't be forgotten, but it is destined to take a back seat in future exploration programs.

Reference

"Developments in Wyoming and Idaho in 1957," by A. L. Lyth, Jr., and P. R. May, AAPG Bulletin, June 1958, pp. 1,350-59.

Are all these dry holes necessary?



SOME SURFACE UPLIFTS are reflected in the subsurface, but an apparently simple surface structure often hides an extremely complex subsurface. Here, the green color depicts surface, the black subsurface.

BY EDITH M. McKEE
Geologist, Glenview, Ill.

ALL GEOLOGISTS connected with the petroleum and natural-gas industries should be increasingly alarmed by the numbers of dry holes being drilled. The recently published[1] figures for the first half of 1958 show that of 22,988 wells drilled in the United States, 8,801—or more than 38%—have been dry holes. It is high time petroleum geologists reviewed their work methods.

While no well can be guaranteed to produce oil or gas before being drilled, a large number of the dry holes should never have been put down. Careful and experienced interpretation of geological data can frequently delineate the productive and nonproductive areas within a structure. This careful and experienced interpretation is being ignored more and more, however, and a generation of well-sitting geological technicians seems to be coming to the fore.

No wonder management sometimes feels able to decide upon drilling programs without consulting any geologists. It also partially indicates why, as a group, geologists are rated lower in authority and salary than are physicists, chemists, and engineers.

Ten years ago, when the AAPG committee on education was compiling its report on geological training in the United States, this trend toward partially trained geologists aimed at the petroleum industry was noted and commented upon. Numerous companies recognized this situation and set up extensive training programs slanted toward their particular needs. However, some freshly hatched geologists were unfortunate enough to be shipped off to the wells alone and, like Topsy, just grew up as best they could. Many of these men have now advanced to positions of some authority, but still are not aware of many of the possible ways of determining correct interpretations of surface and subsurface information.

Interpretation difficult . . . When a definite picture of a structure or region is needed, the well-sitting geologist accustomed only to looking at the records of separate small holes in the ground finds himself baffled. Today reservoir characteristics such as permeability and porosity and wellhead pressure measurements are collected, tabulated, and quoted extensively. Too often the geologists forget to look for the plausible explanations of the rock types and structure characteristics governing these reservoir figures.

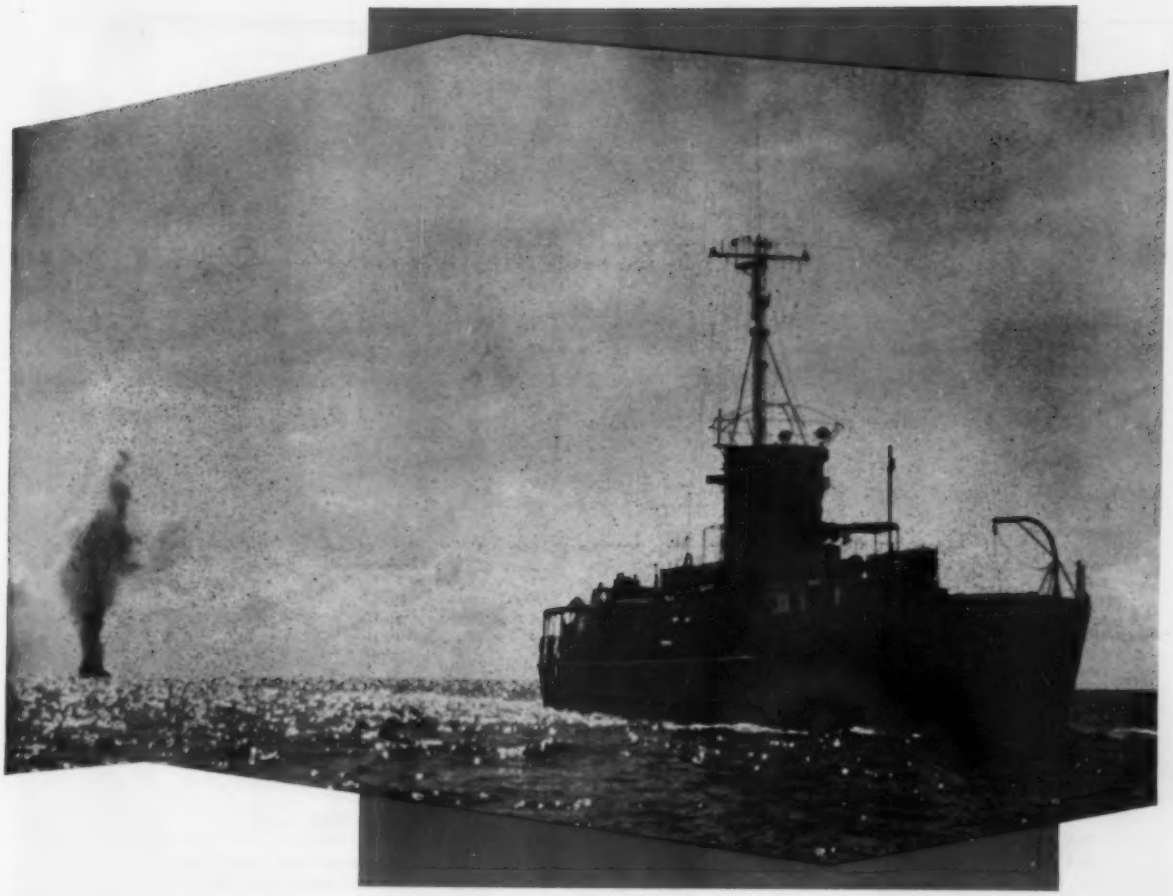
One recent publication describing a gas structure gives page after page of tabulated gas measurements of various sorts and one isopach: the implication being that this is a regularly shaped dome with a sheet deposit of sand which is filled with gas. Had this author done some paleogeographic and stratigraphic work in the area and considered the record of highly variable gas production in the region he would have come to some interesting conclusions.

The structure is a dome, all right, but has been severely eroded with deep radial drainage channels and the gas reservoir is that part of the overlying sand which fills the channels. Any reservoir figures obtained by planimetering the published isopach would be strictly imaginary and wells drilled into the spurs separating the old drainage channels would prove unproductive. Reservoir characteristics are important in deciding how a field should be developed, but much more basic geologic thinking is needed to decide where the reservoir is and why it behaves as it does.

Detailed studies necessary . . . Time after time petroleum geologists are heard to snort derisively at surface geology, geomorphology, and even at shallow-structure drilling. To them the only worthwhile project in geology is hanging around a big rig hoping to find oil, learning the glib patois of the promoters, and enjoying the freedom of having an acceptable excuse for dashing around the countryside at odd

The Author

EDITH M. McKEE worked with the military - geology unit of the USGS during World War II, doing terrain studies. She subsequently spent several years on the Gulf Coast with Shell Oil Co., then left for Saudi Arabia with Arabian American Oil Co. After 5 years in the Middle East, she returned to the United States to join Natural Gas Storage Co. of Illinois. She is now working as an independent geologist.



have ship . . . will search

GSI's Motor Vessel SONIC is currently conducting marine seismic surveys in the Eastern Hemisphere. If you are planning offshore exploration in this area, you can:

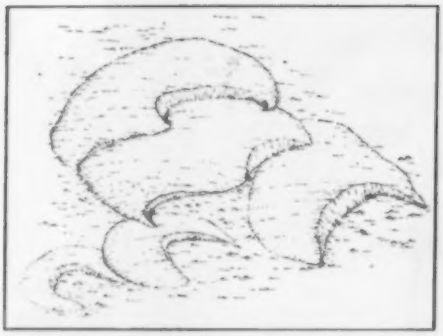
- fully evaluate known structures through seaward extension of land work
- pinpoint areas of interest rapidly and accurately
- save up to 75% the cost of an equivalent-coverage land survey

Write for additional details on availability of the SONIC, a fully-equipped, 405-ton ocean-going vessel which pioneered the single-ship method of marine seismic surveying.

GSI . . . continuing leadership through research and growth

GEOPHYSICAL SERVICE INC.

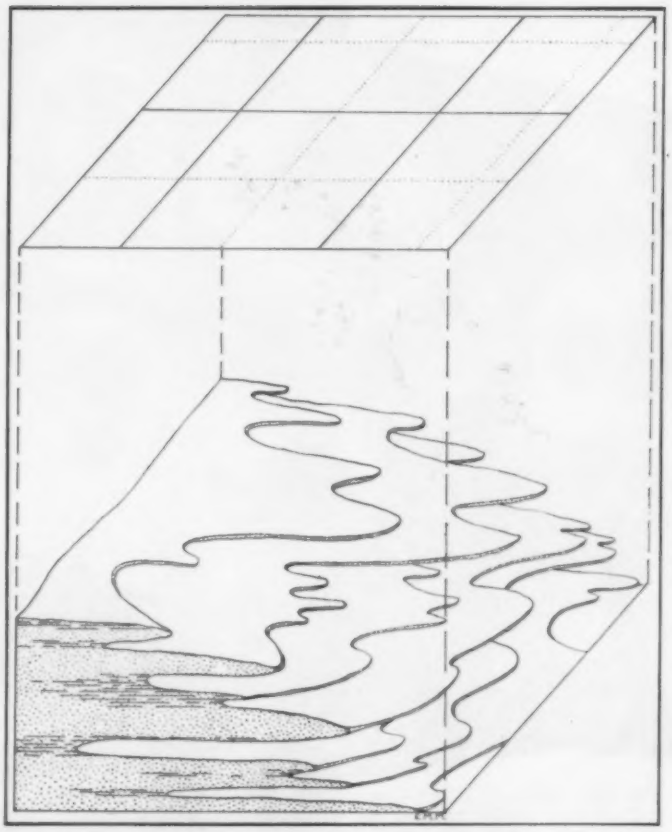
100 EXCHANGE PARK NORTH • DALLAS 35, TEXAS



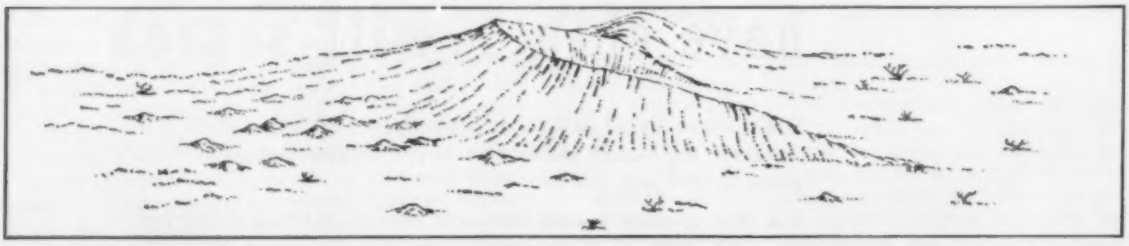
OVERLAPPING SAND DUNES can give the impression of a blanket sand, yet each lens could very easily be a separate oil reservoir.

hours. It appears that these big oil men have never realized that their best chance of hitting pay dirt is by doing a lot of observing and thinking before starting to drill.

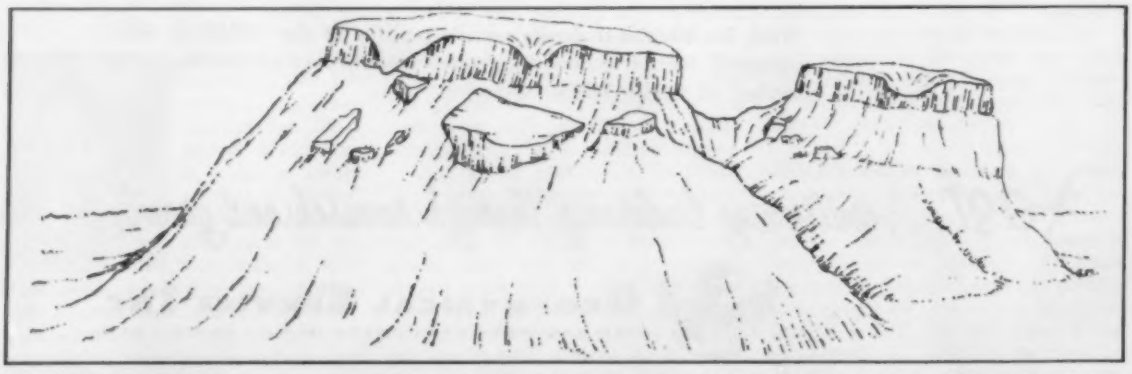
It has never been clearly demonstrated to many geologists that the landforms which they can see all around, and the forces which created them, are exactly the same things which they are trying to determine and map at depth even when modified somewhat by overload compaction and structural movements. This doesn't mean that the surface features at any particular spot necessarily reflect the buried structures. It does mean, however, that although the area is within a glaciated region the sur-



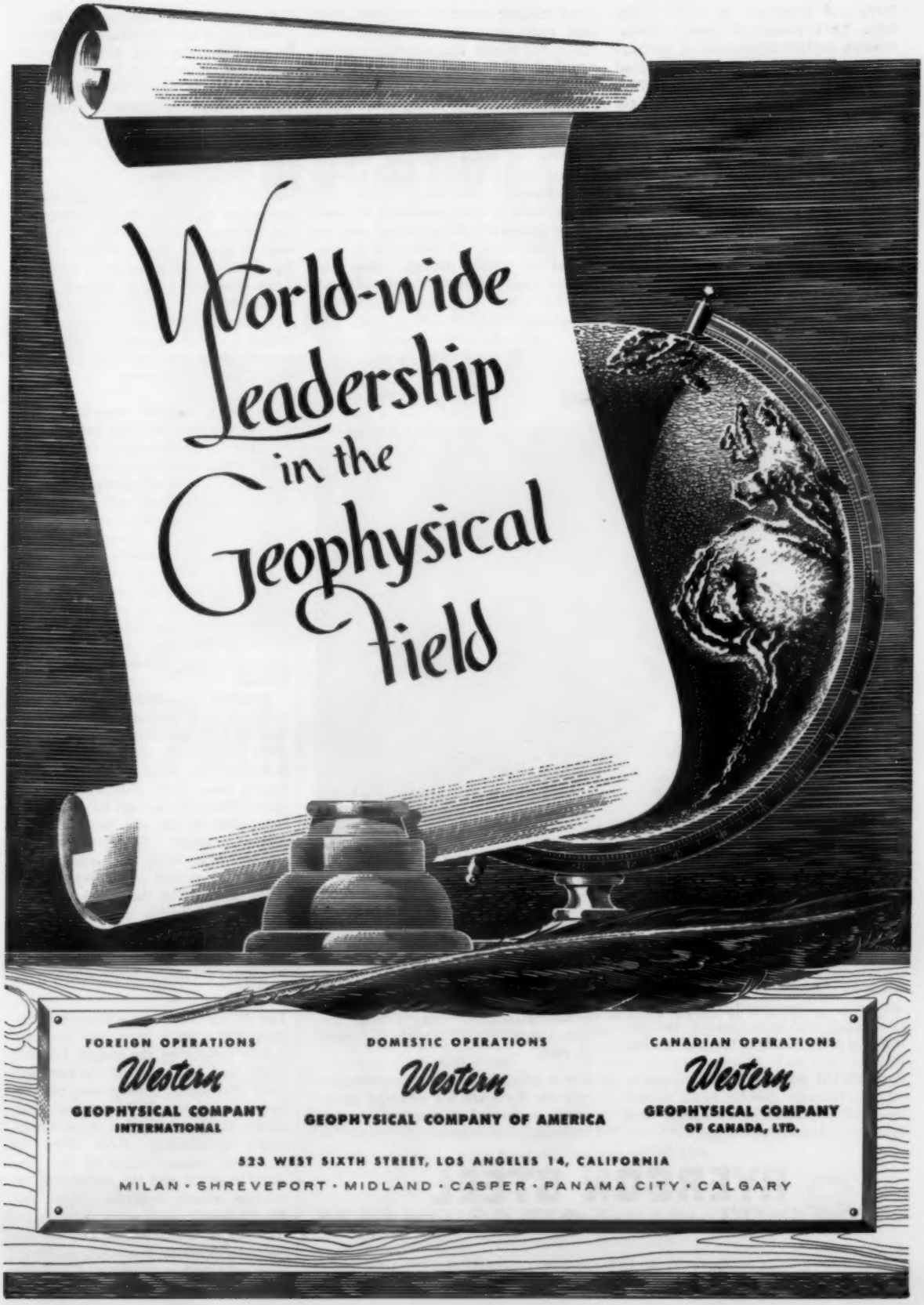
IT IS VERY DIFFICULT to interpret the sand facies in a sand shale sequence. Are we looking at a continuous reservoir or not?



A THOROUGH KNOWLEDGE of the various types of land forms is absolutely essential for a correct interpretation of the subsurface geology.



EROSIONAL REMNANTS pose serious problems for the subsurface geologist. But unconformities and the resultant topographic surfaces are key factors in controlling oil accumulation.



FOREIGN OPERATIONS
Western
GEOPHYSICAL COMPANY
INTERNATIONAL

DOMESTIC OPERATIONS
Western
GEOPHYSICAL COMPANY OF AMERICA

CANADIAN OPERATIONS
Western
GEOPHYSICAL COMPANY
OF CANADA, LTD.

523 WEST SIXTH STREET, LOS ANGELES 14, CALIFORNIA

MILAN • SHREVEPORT • MIDLAND • CASPER • PANAMA CITY • CALGARY

faces and structures at depth might have been developed under warm, shallow marine conditions or perhaps are remnants left by a long sustained arid period. Today, on the surface of the earth and easily observable, are regions of shallow seas and deserts and all the other environments needed for developing paleo and present landforms. There are even areas where little or no plant or animal life affects the mechanical movement of the sands and Precambrian-type dunes can be studied.

Knowledge of geologic cycles essential . . . Long before the apple fell on Newton's pate, gravity had been at work causing water to run down hills and rocks to fall and sediments to settle out where the waters were less agitated. Abrasive sediment loads in water and air scoured out channels and polished rock faces; other sediments in their turn filled up these eroded basins and channels. Without keeping in mind that the surfaces which the geologist is trying to map and interpret were once surface features, there is little possibility of making a geological or structural map of any real value. A geologist is supposed to know enough about the forces involved in the erosional-depositional cycle to interpret scattered, measured elevations into a logical pattern. He should also have a mental collection of enough landform patterns to recognize the type of surface and structures present at depth and to predict where bars, channels, reefs, facies changes, etc. can be expected.

Unfortunately a great many of the subsurface maps drawn today indicate that there has been no reference to observable landforms. Many are obviously an exhibition of mechanically connected datum points and sometimes the contour lines have been drawn in with a straight edge. When puzzled by an area any place on a structure from the top to the bottom, these point-to-point geologists simply draw a closed and hachured contour indicating a closed depression. Why? Obviously there has not been any thinking in three dimensions.

Contouring requires experience . . . Part of the responsibility for this type of mapping derives from the growing attitude that drawing contours and isopachs is a form of drudgery and so should be sloughed off onto junior members; the experienced geologists can then work out glittering reservoir estimates and go wheeling and dealing. Only under this type of setup could a deeply channeled slope have been contoured from the bottom up or a large offshore bar appear as a series of concentric eggs—and these maps have been put out as official publications.

Whether an experienced structural geologist or a beginner does the contouring and structural interpretations there is a simple and direct way of proofing the maps. A perspective sketch done from the contour map shows what sort of mass has been indicated and if all the parts form a plausible whole. Sometimes glaring impossibilities show up indicating a revision is needed or perhaps an entirely new line of thought is sparked. It is also possible to make three-dimensional drawings from isopachous maps showing how they fit into the surface below and affect the stratum above.

The 3-D picture . . . Although geologists deal with a mass and are constantly measuring the length, breadth, depth and thickness of various surfaces and solids, a surprising number never realize exactly how these measurements fit into a full three-dimensional relationship. Even when the structure contour maps of two consecutive strata and the isopach of the stratum which separates these surfaces are well made, they often are not studied in detailed relation to one another. Various practicing geologists have admitted to thinking of isopachs as always having a horizontal plane

STEEL Any type— any time

cuts costly delays

Carbon steel—bars, structurals, plates, sheets, tubing.
Stainless—pipe, tubing, sheets, plates, bars, etc.
Alloys—pretested, heat-identified alloys . . . case-hardening, direct-hardening and heat-treated, including Rycut® free-machining leaded alloys.
Industrial plastics—PVC pipe, valves, fittings, sheets, rods, made-to-order parts; rigid Kralastic and flexible polyethylene pipe.

Metal working machinery—also material handling equipment of many kinds.

Services—fast, accurate processing—sawing, shearing, slitting and flame-cutting . . . any shape, any size, any quantity; always delivered *on time*.

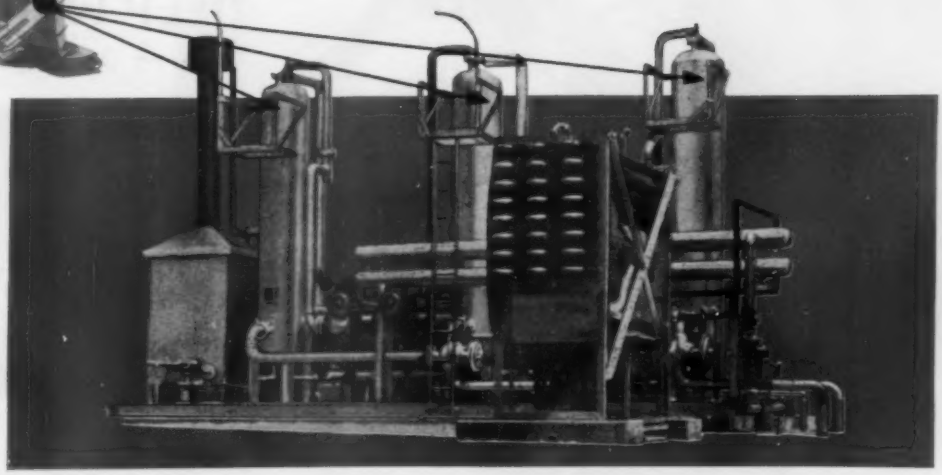
For a single item or a truckload—rely on Ryerson for prompt deliveries, personal attention, expert technical assistance.

RYERSON STEEL®
Member of the INLAND Steel Family

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA CHARLOTTE • CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Get twice the Hydrocarbon recovery

at LESS cost



with a new

Parkersburg DAU type III

The Parkersburg Rig & Reel Company, who originated and still leads in unitized short cycle dehydration-hydrocarbon adsorption units, now announces another remarkable advancement in unit design and application . . . an application that can DOUBLE your distillate recovery over a two tower unit of the same size. The new Parkersburg DAU Type III uses three desiccant towers instead of two as previously used. Actual field tests tell the story.

A 24" Parkersburg DAU Type II (two-tower unit) on a gas stream near Yoakum, in South Texas, was converted to a DAU Type III (three-tower unit). *Distillate recovery jumped from 11 barrels per day to 22 barrels per day,* or DOUBLE the amount recovered through the two-tower unit.

And you save three big ways with a new Parkersburg DAU Type III:

- **Less initial cost** — The DAU Type III will recover as much or more distillate than any other type of the next larger size. This means lower cost of equipment, lower installation costs.
- **Less replacement cost** — Smaller towers are used with a DAU Type III. There is less desiccant to be replaced during maintenance.
- **Less operating cost per barrel of recovery** — The DAU Type III operates on shorter cycles by preheating regeneration gas with retained heat in tower on cooling cycle. Less fuel is required to operate.

Your Parkersburg representative can tell you about the new Parkersburg DAU Type III. See him TODAY!

THE PARKERSBURG RIG AND REEL CO.

THE PARKERSBURG RIG & REEL COMPANY

Division of Parkersburg — Aetna Corp.

PRODUCTION EQUIPMENT DIVISION OFFICES: P. O. BOX 13295, HOUSTON 19, TEXAS

Expressly designed for deepwater locations, this equipment enables drilling where present types cannot operate.

The rig (Figure A) is towed to the drilling site in a buoyant condition, with both the anchor and deck float dewatered. At the drilling site, the anchor is gradually filled with water and lowered to the bottom by the jacking equipment. Once at the ocean floor, the anchor is completely filled with water, firmly seating it on the bottom.

While this operation is in progress, the buoyant float (Figure A) remains on the surface. Once the anchor is seated on the bottom, the Roebling jacking equipment goes into operation to bring the deck float down to operating position, which is at a predetermined level below the area wave action (Figure B).

When the drilling rig is to be moved to another area, the jack action is reversed. Strand is released to raise the deck float to the surface. The anchor float is pumped out sufficiently to permit the jacks to raise it to traveling position, under the deck float. During all of these raising and lowering operations, the strand is spooled up and payed off by means of power operated storage reels.

This is another example of how Roebling suspension systems and their principles can be—and are constantly—applied in the unlikeliest of places. Roebling's design, construction and service abilities range far and wide, embracing pipe line bridges, material and personnel tramways, ski lifts, guyed towers, suspended roofs and *suspension systems of all kinds*. We welcome inquiries of any nature on this new equipment for offshore drilling rigs. Write Bridge Division, John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

FIG. A

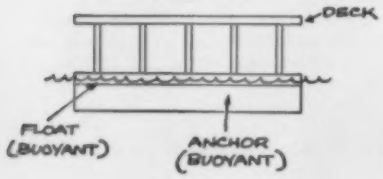
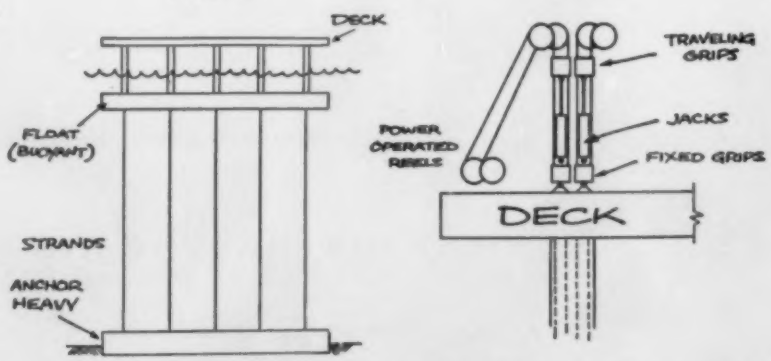


FIG. B



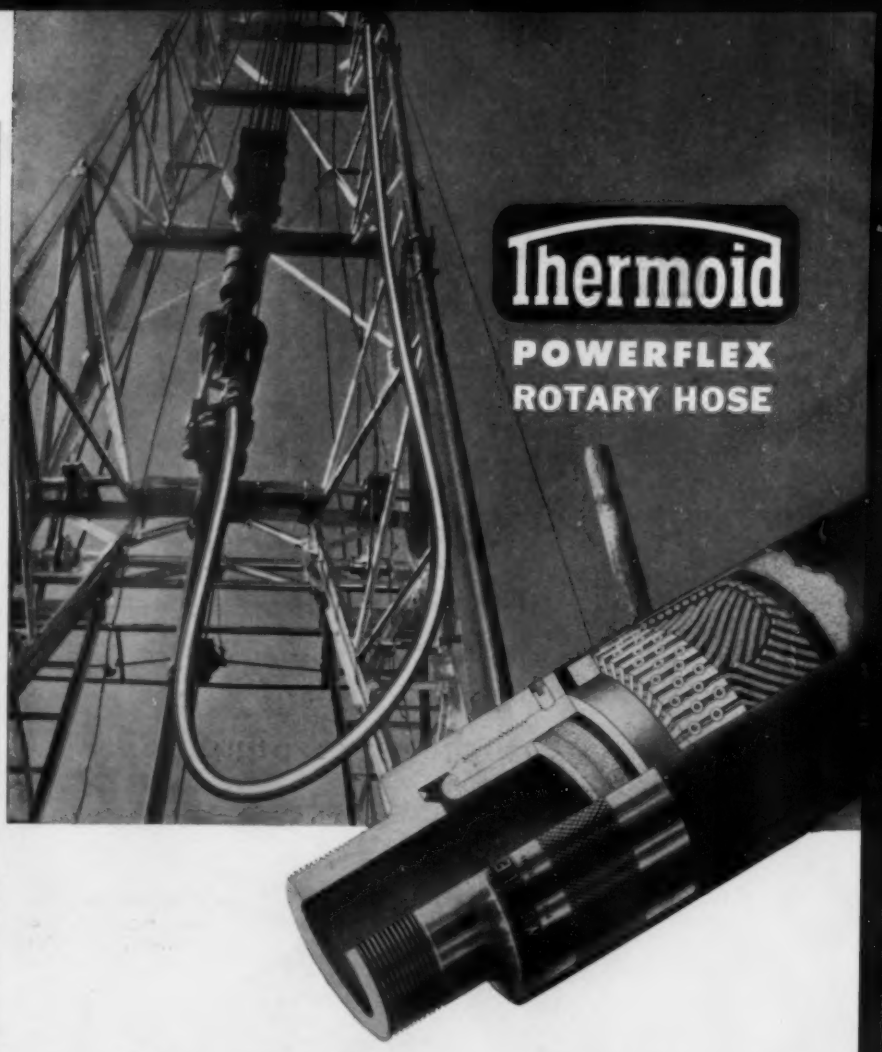
for a base and all the thickness showing as relief. Many never do readjust a stratum to its proper structural relationship after arbitrarily referring it to a horizontal plane for cross-sectional purposes.

Paleontologists and mineralogists have always depended upon perspective pictures to report their fossil and crystal determinations. When a photograph cannot give an adequate picture, a drawing is made. More of the currently working geologists could use drawings to better show what structural and stratigraphic relationships they are working with. Certainly photographs are excellent where they can be made; and color photos of cores are much handier for office and conference work than are the cores themselves. Pictures of a buried surface are impossible, though, unless a drawing or model is first made from the contour and isopach maps. While perspective drawings of geologic data are attractive and nearly self-explanatory additions to a report they are much more than just pretty pictures. They clearly show why a well is advised for one location and avoided in another, using language that can be understood by geologists, engineers, top management, and bankers.

The value of three-dimensional drawings for geological reporting has long been recognized. All of the greatest of the early geologists had their field notebooks liberally salted with sketches illustrating geological relationships. During World War II the military-geology unit of the USGS had a group of geologists headed by Dr. P. B. King drawing terrain diagrams, to scale, for military planning and operations; Dr. Raymond C. Moore did similar work for the Chiefs-of-Staff as well as the many illustrations for his books and publications. Such noted workers in geomorphology as C. A. Cotton and O. D. von Engeln have relied extensively on drawings in addition to photographs to more clearly show how rocks and surface forces and structures influence each other.

Many of the most competent geologists don't just glibly say that they think in three dimensions. They make quick sketches in perspective trying out various interpretations of the available data. It is the old multiple-hypotheses theory using a visible means of expression. For this type of work it does not matter how polished an artist you are. An observant and thinking geologist—and there are a goodly number of them—who can doodle in perspective is the one who can come up with the ideas—and practical ones at that.

Instead of sloughing off the work



"tops with tool pushers"

Tool pushers know from experience that *Powerflex* Rotary Hose is built for rugged oil field service. The *patented Full-Flow coupling* cannot leak or pull off for the life of the hose. Made of forged steel, it is an integral part of the cable assembly. Both the Neoprene tube and the cover are oil and abrasion resistant and reinforced with impregnated multi-ply woven fabric. *Every length is pre-tested to 5000 psi* . . . exceeds all ASI requirements.

Order Thermoid Hose, Multi-V Belts and Brake Blocks—for all oil field applications, from your nearest supply store or Thermoid Warehouse.

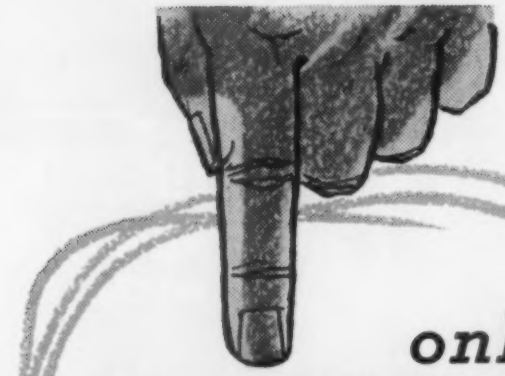
For rugged oil field service, always specify Thermoid Brake Blocks.

Thermoid

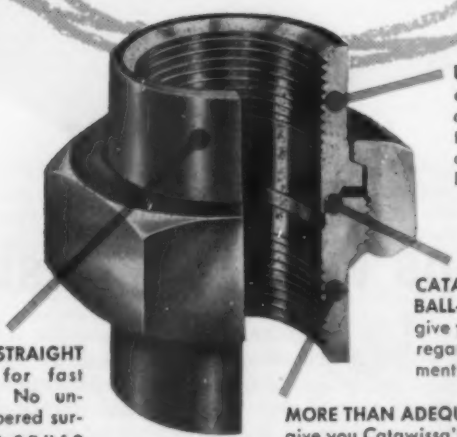
Thermoid Company
Trenton, New Jersey • Nephi, Utah

Warehouses:

Dallas, Texas	Oklahoma City, Okla.
Houston, Texas	St. Louis, Mo.
Odessa, Texas	Great Bend, Kansas
Abilene, Texas	Casper, Wyo.
Houma, La.	Los Angeles, Calif.



only
CATAWISSA
gives you all these features for your forged steel pipe union requirements



UNIFORM WALLS for even expansion and contraction under temperature changes. THEY FOLLOW THE PIPE!

CATAWISSA BALL-TO-ANGLE SEATS give you a "Perfect Seal" regardless of pipe alignment!

ROUND, STRAIGHT BARRELS for fast wrenching. No uneven or tapered surfaces to cause wrench slips or wrench locking!

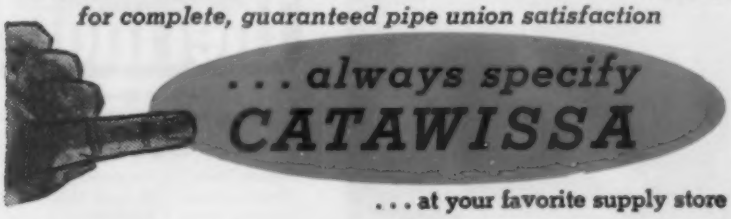
MORE THAN ADEQUATE wall thicknesses give you Catawissa's 3-to-1 Safety Factor (3000-lb. service, 9000-lb. test; 6000-lb. service, 18000-lb. test)!

Catawissa Perfect Seal Pipe Unions are made by Union Specialists from 80,000-lb. tensile strength steel (ASTM Spec. A-105-55T, Grade II). Steel forgings from our own forging mill are closely checked for imperfections . . . and finishing on modern, automatic machines with close inspection during and after production give you pipe unions second to none!

Get your free copy of Catalog 56 showing the complete Catawissa line . . . write direct or stop at your favorite supply store.

CATAWISSA VALVE & FITTINGS COMPANY • CATAWISSA, PENNA.,

for complete, guaranteed pipe union satisfaction



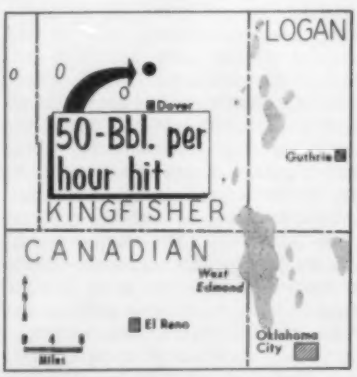
. . . at your favorite supply store

of contouring and isopaching, it is the experienced geologists who should be making the final correlative and interpretive maps. They are the ones who should already have a broad training in various phases of geology, an extensive mental atlas of land-form patterns, and have been exposed to a wide range of thinking habits and ideas. To offset the early-stage drudgery of plotting and computing data, automation can now help out. Methods are available for routine computations and for plotting well positions by use of IBM punched cards and computers.

If more attention is paid to the basic interpretations of data derived from wells and dovetailed with regional paleogeographic, stratigraphic, and tectonic studies the proportion of producing wells drilled will increase and fewer dry holes will be put down. Certainly management, bankers, and stockholders are more interested in a successful and paying well than in dazzling reservoir estimates which can never be realized.

Reference

1. The Oil and Gas Journal, July 18, 1958, p. 129.



PROLIFIC OIL FLOW is reported at a wildcat north of Dover in Kingfisher County, Oklahoma.

Wildcat hits in oil-barren area

A HIGH-FLOWING oil discovery is reported near Dover in Kingfisher County, Oklahoma. The discovery well is Jones, Shelburne, and Pellow Oil Co. 1 Myers, SW SE 15-18n-7w, located in oil-barren territory west of the Nemaha ridge.

Test of the Manning at 7,020-47 ft. got 5,760 ft. of clean oil. Operator is running casing for testing. An indicated 50-bbl. per hour flow capacity is reported.

STREAMLINE CONTROL of SAND-FLUID RATIO

For better over-all efficiency in the preparation of fracturing mixes, Halliburton's *streamline* operation gives continuous on-the-job preparation, accurate proportioning and control of Sand-Fluid ratios.

Proportioners and Booster Pumps arranged in proper sequence with other equipment provides a continuous operation in sending the prepared fracturing mix to the well through Halliburton diesel-powered high pressure pumps.

Instantly variable control provided by Halliburton Proportioning Equipment throughout a wide range of injection rates helps to assure you of successful fracturing treatments.

For further information about this field proven method that combines accuracy, flexibility and constant control of sand-fluid ratio, talk to your local Halliburton Representative . . . he is backed by the industry's best Technical and Research assistance.

ASK FOR BULLETIN: ELEMENTS OF HYDRAULIC FRACTURING

HALLIBURTON FRACTURING SERVICES

HALLIBURTON OIL WELL CEMENTING COMPANY • DUNCAN, OKLAHOMA

THE PIONEER IN FRACTURING SERVICES

Wide spread San Joaquin Valley strikes attract attention

TWO AREAS in California, both in San Joaquin Valley but at opposite ends of it, are attracting the most interest these days. One is a gas field development and the other oil.

In southern San Joaquin Valley in Kern County, the year-old 555 pool development in Buena Vista Hills field continues to turn up excellent extensions.

The pool was found November 10, 1957 by Tidewater Oil Co. on the northwest end of the field with a 6,993-ft. wildcat in SW SE 20-31s-23e. It tapped an upper Miocene pay at 5,059-5,199 ft. for 400 bbl. daily of 31.2°-gravity crude.

Since that time, Standard Oil Co. of California and Richfield Oil Corp. have joined Tidewater in the play with successful completions virtually surrounding the Tidewater discovery.

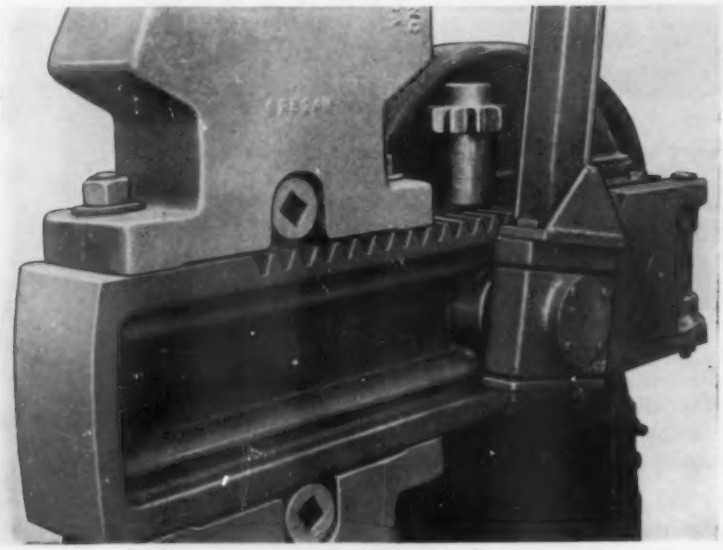
The latest development is a reported excellent extension test by Honolulu Oil Corp. nearly ½-mile west of the nearest production. The Honolulu extension flowed high-gravity crude at a 912-bbl. daily rate through a ¼-in. choke on a test of the upper Miocene at 5,233-5,301 ft.

In addition, both Honolulu and Standard tested a shallower gas sand at 3,900 ft. in recent weeks. Both reported a flow potential of 5 M.M. c.f.d.

Vernalis . . . The other hot spot in San Joaquin Valley is at Vernalis gas field in the extreme north end of the valley.

The combination of Porter Sesnon-Great Basins Petroleum Co. has been conducting a one-well-at-a-time development program in this field with each succeeding well apparently better than the discovery which was good for 2,500 M.c.f.d.

The next well made 12-15 M.M. c.f.d. and a third well just completing is reportedly as good or better than the first two.



NEW
JENSEN ROTARY COUNTERBALANCE

Jensen's rack-and-pinion system makes weight adjustments a safe and simple operation for just one man—standing on the ground. Gives both lead and lag counterbalance, requires no special equipment.

And that's just one of the many forward-looking features you'll find on the all-new JENSEN ROTARY BALANCED JACK. For the full story, call, wire or write us —today!

STOCKED BY YOUR LOCAL SUPPLY STORE

Made by JENSEN BROS. MFG. CO., INC., P. O. Box 477-F, Coffeyville, Kansas
Export Office: 250 Park Avenue, New York 17, N. Y.

JENSEN JACKS

Swanson River well on production

THE Swanson River unit discovery well, 1 Swanson River Unit, has been put on production at a rate of 500 bbl. daily since October 31.

Clean 32°-gravity crude is being produced through a 12/64-in. choke from 11,150-11,215 ft. The oil is trucked to Seward and then tankered from there to Richmond, Calif., on San Francisco Bay.

Standard Oil Co. of California, operator for itself, Richfield Oil Corp., Union Oil Co., and Ohio Oil Co., was coring at 11,613 ft. on 3 Swanson River and was reading location for a fourth test of the 71,600-acre unit.

Drill digs deep in San Juan basin

DEEP EXPLORATION is in store for the San Juan basin. Shell Oil Co. is moving in to dig a 12,000-ft. Elbert-Devonian test inside Bisti-Gallup pool in San Juan County, northwest New Mexico.

The 113-17 Carson Unit, if it hits the objective, will get a look at the entire Pennsylvanian and Mississippian section of the basin plus the Ouray-Devonian. There have been only three deep tests in the basin. Continental Oil Co. took one below 12,000 ft. on the east side of the basin, Magnolia dug one on the southeast side, and Pan American Petroleum Corp. drilled one on San Juan's north side.

Location of the important new wildcat is in NW SW 17-25n-11w, near the center of Bisti field. It is a well to watch.

HERE IS THE TALLY OF SHALLOW-WELL COMPLETIONS IN PENNSYLVANIA DURING THE THIRD QUARTER OF THIS YEAR.

COUNTY	Oil No. wells	Oil Footage	Gas No. wells	Gas Footage	Water input No. wells	Water input Footage	Dry holes No. wells	Dry holes Footage
Armstrong	..	.....	50	158,953	..	.....	2	6,101
DD*	..	.....	2	3,811	..	.....	..	.....
Butler	..	.....	1	3,642	..	.....	..	.....
Clarion	..	.....	9	23,490	..	.....	5	13,747
Clearfield	..	.....	..	.....	..	.....	1	2,514
Elk	..	.....	1	2,285	..	.....	1	2,339
Fayette	..	.....	1	2,098	..	.....	..	.....
Forest	..	.....	1	2,278	..	.....	..	.....
Greene	..	.....	..	.....	..	.....	1	1,857
DD	..	.....	1	1,000	..	.....	..	.....
Indiana	..	.....	13	44,138	..	.....	1	3,966
Jefferson	..	.....	6	18,165	..	.....	2	6,185
DD	..	.....	1	500	..	.....	..	.....
Lackawanna	..	.....	1	3,800	..	.....	..	.....
McKean	52	91,874	..	.....	23	43,400	..	.....
DD	1	110	..	.....	..	.....	..	.....
Potter	..	.....	2	4,047	..	.....	..	.....
Tioga	..	.....	..	.....	..	.....	1	1,800
Venango	3	3,011	..	.....	1	1,126	4	4,102
Warren	1	1,051	..	.....	..	.....	..	.....
Washington	..	.....	1	2,812	..	.....	..	.....
Westmoreland	..	.....	8	20,515	..	.....	1	3,477
Totals	56	95,936	94	286,223	24	44,526	19	46,089
DD	1	110	4	5,311	..	.....	..	.....

Total new wells drilled during third quarter in Pennsylvania	193
Total footage of new wells	472,774
Total wells drilled deeper	5
Total footage of wells drilled deeper	5,421
Total footage of all wells	478,195

*Drilled deeper.

Deep wells pay in Pennsylvania

DEEP Pennsylvania wildcats currently busy include Manufacturers Light & Heat Co. 1 Bender in Somerset County. This Negro Mountain anticline wildcat was fractured in the Onondaga chert, continued drilling, and found the Oriskany from 8,438 to 8,550 ft. Total depth is 8,552 ft. The company is preparing to fracture the Oriskany. Production from the chert section amounted to 1,500 M.c.f.d. after fracturing.

- Peoples Natural Gas Co. 1 James S. Blair in Westmoreland County, drilling on the Seven Springs anticline, had an open-flow potential of 3,663 M.c.f. before fracturing. The operator is going to fracture the zone. Pay is the Onondaga chert with total depth at 7,831 ft.
- The Margaret Rupert well of Columbian Carbon Co. in Armstrong County, drilling on the Roaring Run anticline, was fractured for 1,640 M.c.f. in the Onondaga chert, topped at 6,963 ft. This well is to be fractured in the Oriskany.

Illinois gets one pool in October

ONE NEW POOL, New Baden East in Clinton County, was discovered in Illinois in October.

There were five extensions to pools, as follows: one each to Hord North in Effington County, Dale Consolidated in Hamilton County, Clay City Consolidated in Richland County, Zenith North in Wayne County, and Warrenton-Borten in Coles County.

A total of 198 wells were completed in October, a 4-week period. The completions include 89 oil wells and 12 gas wells or 51% successful.

Clay and Wayne counties, each with 16 completions, had the most completions for the month. Hamilton and White counties followed with 14 completions each.

Estimated production for Illinois for October is 6,950,000 bbl. of oil.

This announcement is not an offer of securities for sale or a solicitation of an offer to buy securities.

New Issue — November 7, 1958

$30,000,000

Natural Gas Pipeline Company of America

First Mortgage Pipeline Bonds, 4⅝% Series due 1978

Price 99¼%
plus accrued interest from November 1, 1958

Copies of the prospectus may be obtained from such of the undersigned (who are among the underwriters named in the prospectus) as may legally offer these securities under applicable securities laws.

Dillon, Read & Co. Inc. — Halsey, Stuart & Co. Inc.

The First Boston Corporation — Kuhn, Loeb & Co.

Blyth & Co., Inc. — Eastman Dillon, Union Securities & Co. — Glore, Forgan & Co.

Goldman, Sachs & Co. — Harriman Ripley & Co. Incorporated — Kidder, Peabody & Co.

Lazard Frères & Co. — Lehman Brothers — Merrill Lynch, Pierce, Fenner & Smith

Smith, Barney & Co. — Stone & Webster Securities Corporation

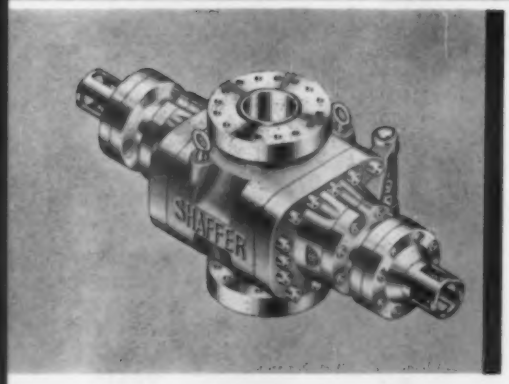
White, Weld & Co. — Dean Witter & Co. — A. G. Becker & Co. Incorporated

IT'S SHAFFER

for the Most Outstanding Line of...

BLOWOUT PREVENTERS!

No matter what *your* blowout preventer requirements may be, Shaffer not only has a unit to fill them—but also offers performance and safety advantages you'll find nowhere else. For example, check over the *range* of equipment Shaffer offers...



TYPE XHP for Working Pressures to 15,000 PSI!

For safely handling *Extra High Pressures*, Shaffer offers three sizes of XHP Preventers—7 1/16" bore, 9" bore and 11" bore. The 7 1/16" bore is individually tested to 22,500 PSI for a safe *working* pressure of 15,000 PSI. The 9" and 11" bore sizes are individually tested to 15,000 PSI for a safe *working* pressure of 10,000 PSI!

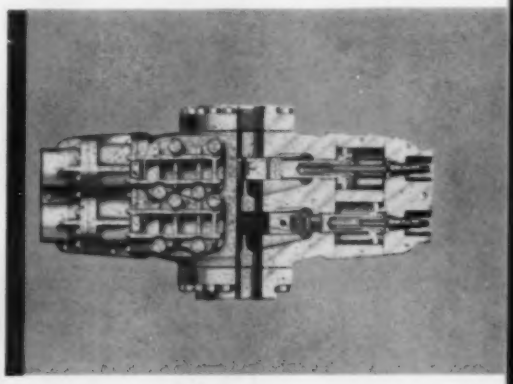
All sizes feature convenient "Swinging End-Opening" ram changes without loss of operating fluid... positive "In-Line" ram and piston design ... built-in hydraulic lines... in fact, many unique advancements you'll find only in Shaffer Gates. All sizes of XHP Preventers can be assembled either in Single or Double hook-ups to meet individual requirements!

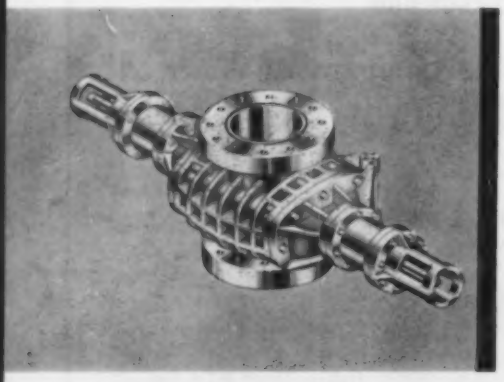
TYPE B and TYPE E for Most Drilling Operations!

For wells where normal pressures are encountered, Shaffer offers the Type B and Type E Hydraulic Gates. The Type B has a *non-rising* locking shaft for installations where maximum compactness is desired... the Type E has a *rising* locking shaft where quick indication of ram position is desired.

Both types feature the convenience of "Swinging Side-Opening" ram changes without loss of operating fluid... positive "In-Line" ram and piston design... and many other features that make these the most advanced hydraulic gates available for most drilling operations.

Complete range of bore sizes—7 1/16" through 15 1/2"—in both Single and Double Gate designs!





TYPE LWS for Lightweight Portability!

For pressure protection on drilling and production operations where maximum portability and minimum rig-up time are important factors, Shaffer Type LWS Hydraulic Gates are without equal. Designed to take full advantage of the latest precision alloy steel casting techniques, they are light in weight and are ideal for quick "in-and-out" operations on drilling, production and re-work jobs.

They feature the convenience of "Swinging End-Opening" ram changes without loss of operating fluid... positive "In-Line" ram and piston design... and other Shaffer advancements. To further facilitate operations, a portable hydraulic hand pump is available that will open or close Shaffer Type LWS Gates in from 15 to 20 *seconds*. No time need be wasted rigging up hydraulic systems for quick repair and maintenance jobs!

Available in 7 1/16" Bore Size—in both Single and Double Gate designs!

In Addition

to the above Shaffer Hydraulic Gates, Shaffer also manufactures a complete line of *Mechanically* operated gates—both Single and Double Gate design.

Write for full details on the particular type of Shaffer Blowout Preventer that fits your needs. Or see your nearest Shaffer representative for complete details!

36 years OF OIL TOOL LEADERSHIP

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, California • California Service Shops: Santa Fe Springs and Taft
HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1925 West Second Street
OKLAHOMA CITY, OKLAHOMA, Shaffer Tool Works, Post Office Box 546
FARMINGTON, NEW MEXICO, Shaffer Tool Works, Post Office Box 1788
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 827
HOUMA, LOUISIANA, Shaffer Tool Works, Post Office Box 1077
EXPORT SALES OFFICE Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.

Illinois strike has good flow

A NEW POOL was opened by James E. Carter 1 John Utley in Gallatin County, Illinois. This is one of the best strikes in the state in some time.

During tests the well made 48 bbl. per hour, natural, from the Aux Vases at 2,696-2,754 ft. Location is in NW SW SE 34-7s-8e, 2 miles south of Omaha. The well came in as a gusher on October 24. Since that time it has been flowing 1,000 bbl. of oil daily. Rigs are being moved in for three new trys in the same area.

COLORADO'S newest producing county is apparently Prowers in the southeastern portion of the state.

Colorado's Prowers indicates gas find

PROWERS COUNTY in southeastern Colorado may become the newest producing county in that state. Excelsior Oil Co. recovered gas at the daily rate of 2,055 M.c.f. on 12-hour test of the Pennsylvanian-Morrow sand at the 1 Bailey in NE SW 27-25s-45w, 35 miles from production.

The reported flow was gaged after acid treatment of perforations at 4,912-22 ft. Operator has shut in the well pending more tests. Nearest production of note is to the southeast in southwestern Kansas' Greenwood and Hugoton field areas.

Kentucky deep test continues

EASTERN KENTUCKY'S deepest test continues to set new records each day as drilling continues at 10,820 ft. and presumably still looking for basement.

Well is that of United Fuel Gas Co. 1 S. B. Williams on Quicksand Creek, 4 miles east of Jackson, county seat of Breathitt County. Last reported top was Knox Dolomite at 4,560 ft.

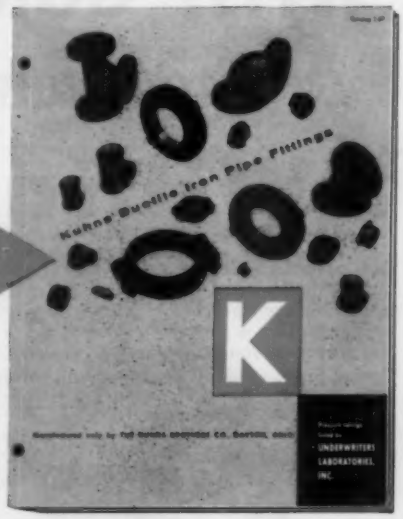
WHAT DO YOU WANT TO KNOW ABOUT KUHNS

DUCTILE IRON

PIPE FITTINGS?

THE ANSWERS ARE HERE

YOURS FOR THE ASKING!



Get complete data on—

- Types and sizes available
- Typical applications
- Safety factors and service ratings by Underwriters' Laboratories, Inc.
- Prices
- Physical properties; production control tests
- Specifications—A.M.S., A.S.T.M., Ordnance, Navy, Coast Guard, National Fire Protection Association, National Board of Fire Underwriters, Corps of Engineers
- Impact test data

DUCTILE IRON PIPE FITTINGS MANUFACTURED ONLY BY

THE KUHNS BROS. CO.
DAYTON, OHIO

THE KUHNS BROTHERS CO.
1800 McCall Street, Dayton, Ohio

Send me a free copy of Catalog 2-PF on ductile fittings.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

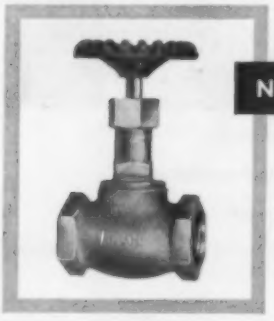
YOU CAN BUY WITH CONFIDENCE

when you specify

D.T. Williams valves

Quality is the watchword that governs the design and the manufacture of every D. T. Williams valve. From castings to final assembly, careful machining, thorough inspection, and rigid tests combine to produce valves that will perform to the highest standards. This is the reputation and the record of D. T. Williams over the years. It is the reason you can buy with confidence when you specify D. T. Williams Valves.

These valves meet Government, Marine and Industrial specifications.

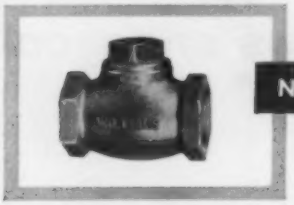


No. 50 Bronze Globe Valve—Bronze Disc. This valve has an integral seat, deep stuffing box, molded ring packing and screw ends. Swivel disc is provided on ¾″ and larger sizes. Steam pressures to 125 lbs. and non-shock water, oil or gas to 200 lbs., at 150° F. Available in sizes ⅛″ to 3″.

Meets Government Specification WW-V-51, Class A, Type I.

No. 55 Bronze Angle Valve—Bronze Disc. Has an integral seat, deep stuffing box, molded ring packing and screw ends. Swivel disc is provided on ¾″ and larger sizes. Steam pressures to 125 lbs. and non-shock water, oil or gas to 200 lbs., at 150° F. Sizes ⅛″ to 3″.

Meets Government Specification WW-V-51, Class A, Type II.



No. 60 Bronze Horizontal Lift Check Valve—Bronze Disc. Provides integral seat and screw ends. For steam pressures to 125 lbs. and non-shock water, oil or gas pressures to 200 lbs., at 150° F. Available in sizes ⅛″ to 3″.

Meets Government Specification WW-V-51, Class A, Type III.

Always specify D. T. Williams Valves . . . the valves with a reputation built on quality and performance.

Detroit Controls Division of American-Standard, 5900 Trumbull Ave., Detroit 8, Mich.

AMERICAN-Standard
DETROIT CONTROLS DIVISION

New map available

KENTUCKY Geological Survey's new oil and gas map of Green County has been revised and brought up to date. Dr. Wallace W. Hagan, state geologist, announced that the new edition contains the locations of more than 600 wells, 520 of which are identified.

"Green County, Kentucky, is currently the most active area of shallow oil exploration in the nation," Dr. Hagan stated. "There are still 85 to 100 rigs in operation and the oil production is currently 13,000 bbl. per day.

Maps can be purchased at the Kentucky Geological Survey office on the University of Kentucky campus in Lexington.

Michigan drilling tempo improving

SEVENTEEN drilling permits including six wildcats issued by the State Geological Survey for the week ended November 1 again reflected the improving position of Michigan oil development.

The 17 starts in 1 week contrasted to an average of 9 permits per week the first 10 months of the year.

While current interest centers largely in the St. Clair County area, southern Michigan is claiming most attention in exploratory work on the basis of acreage blocks taken a year ago and deals now crystalizing following the Scipio pool discovery in Hillsdale County. Scipio field, where activity is down to two rigs, may get revived development as the result of a prolific Trenton oil well drilled on the north side of the pool. Aurora and McClure A-1 Rowe, SE SW SE 3-5s-3w, flowed 98 bbl. oil in 40 minutes on drill-stem test at 3,820-4,007 ft.

Important Sooner field gets new pay

KANSAS CITY LIME of Pennsylvanian age is another new pay for North Buffalo field in Harper County—a northwestern Oklahoma Arbuckle and Oswego producer.

Sinclair Oil & Gas Co. 1 Rosa Lee Kuhn, C NW SE 6-28n-22w, flowed 90 bbl. of oil in 6 hours on ½-in. choke. On 24-hour test it flowed 248 bbl. and 1,514 M.c.f. of gas per day.

The Kansas City lime perforations are at 5,212-26 ft. The same well only earlier last week flowed 211 bbl. per day from the Oswego at 5,423-36 ft. and 1,900 M.c.f.d.

Montana field given spacing

THE Montana Oil and Gas Conservation Commission has approved 40-acre spacing for new Red Creek field in Glacier County.

Current drilling in this field includes Trigood Oil Co.'s new location in 13-37n-5w and two locations in 12-37n-5w; Trigood abandoned 1 Swenson in NW NE NW 13-37n-5w, at 2,880 ft. in the Madison. West of the field, Essex Oil Co. 1 Thompson quit at 2,835 ft. in the Madison in NE NE SE 11-37n-5w; Salt Dome Production Co. reached the Madison and is testing at 2-A Moberly in C NW SW 1-37n-5w. Oil and gas were recovered on tests of the Cut Bank.

New names for new Nebraska pools

NEBRASKA has four new fields.

They are: Farrell field in Kimball County, Forsling field in Kimball County, Hawthorne field in Kimball County, and Mar field in Morrill County.

Sunburst Petroleum Co. opened Farrell field at 1 Farrell in C SE NE 34-13n-54w; Tom Palmer, Inc., opened Forsling field at 1 Forsling in C NE NW 7-14n-56w; Shoreline Petroleum Co. opened Hawthorne field at 1 Hawthorne in C NW SE 23-13n-55w; and Nebraska Drillers, Mar Oil Co. opened Mar field at 1 Stark in C SW SW 5-17n-51w.

Books for oil finders

THE New Mexico Geological Society announces the guidebook of the Black Mesa basin in northeastern Arizona's ninth field conference held October 16-18, 1958. This guide was prepared in cooperation with the Arizona Geological Society. It was edited by Roger Y. Anderson and John W. Harshbarger.

The guidebook contains a complete account of the field trip through the Black Mesa basin. It is well illustrated and will be of utmost interest to those interested in the nation's newest and hottest oil province, the Four Corners. Guidebooks may be obtained from the New Mexico Bureau of Mines and Mineral Resources at Socorro.

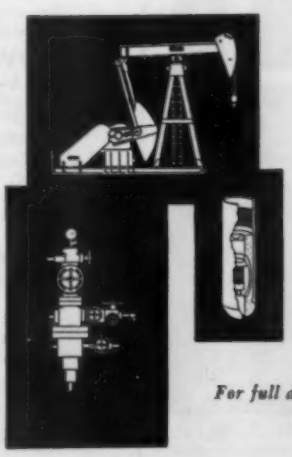
This field trip is the first major excursion into the Black Mesa basin. Geologists from both Arizona and New Mexico, and from other areas, have contributed to the writing and organization of the guidebook although much of the administrative work was handled by the New Mexico Society. The book takes a regional approach to the stratigraphy, structure, and geomorphology of the basin. The region contains a number of unique topographic, geologic, geomorphic, and cultural features that have been discussed in the road logs and special papers. In addition, the book has seven papers devoted to the economic aspects of this relatively untapped and unknown region.

The field conference offered an opportunity to observe a stratigraphic section that is probably as complete as any to be found in an area of comparable size. The trip into the Grand Canyon offered rocks ranging in age from Recent to older Precambrian, with only the early Tertiary and Ordovician-Silurian missing.

The first day of the trip revealed the structure of the Defiance uplift and monocline and the stratigraphy of the southeastern part of the basin. On the second day the conference entered the basin itself, traversing volcanic fields., Pliocene lake beds, diatremes, and areas of ancient Indian cultures. On the third day, the conference took a circuitous route through the San Francisco volcanic field to the Grand Canyon.

"This ain't my kind of Pumping!"

says Mike LE GRAND



who knows a thing or two about pumps and well-head equipment, 'cos he's in for a trouble-free time when LeGrand equipment is in use.

Rugged—dependable—built to do its job under all conditions—with a unit to take every kind of load.

Also available: LeGrand OCT. Wellhead Equipment; LeGrand Howco Floating Equipment; and LeGrand-S. C. Carter Long-Stroke Hydraulic Pumping Units.

For full details, please write to:—

LE GRAND ROCHESTER LIMITED.
HORSTED AIRPORT, ROCHESTER, KENT, ENGLAND
Telephone: CHATHAM. 44626.

Also represented in the following countries:—

CANADA, TRINIDAD, VENEZUELA EASTERN, VENEZUELA WESTERN, IRAQ

THOMPSON
SAND RESISTANCE
OIL WELL PUMPS

TRAVELING PLUNGER ROD TYPE BOTTOM HOLD-DOWN PUMP STANDARD SIZE

Figs. 400P, 600P, 700P, 800P

Single or double, self-aligning, combination cup and plunger or all-metal traveling plunger type, pumps made in four sizes: regular 1½", 1⅝" oversize, 2" regular and 2⅛" oversize bore. These pumps seat in API seating device. In very sandy wells, or when tubing is out, we recommend our SAND HOUSING MECHANICAL SEATING SHOE, which prevents sanding in of pumps as sand can be pumped and the pump pulled at any time by our sand flushing arrangement.

TOP HOLD DOWN INSERT ROD PUMP

Standard Size, Figs. 400T, 500T

Self-aligning double plunger insert pumps. Made in three types: combination cup and single plunger; combination cup and double self-aligning type; and metal-to-metal double plunger self-aligning type. All are equipped with Regular or Extra Long Alloy Plungers, ground individually to fit the barrels, assuring longer life on both pump and surface equipment.

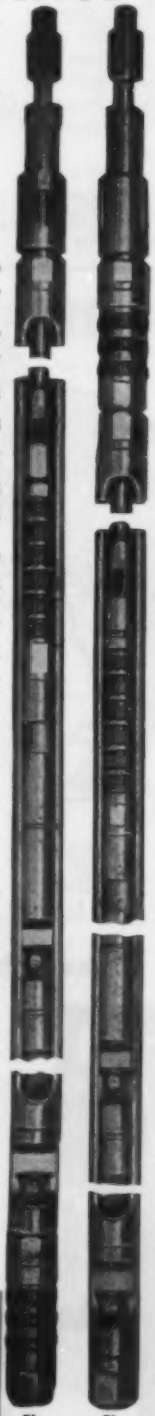


Fig. 400P 600P 700P 800P

Fig. 400T 500T

THOMPSON PUMP COMPANY
DRAWER 591
OKMULGEE, OKLA.

STOCKS • BONDS
COMMODITIES

★ RESEARCH ORGANIZATION: Specialized and general information and statistics by telephone or mail.

★ BONDS AND UNLISTED SECURITIES: Extensive facilities for reaching large and small markets.

★ COMMODITIES: Long experience in handling grain, cotton and other commodities.

★ SUPERVISED INVESTMENTS: Portfolio analysis and continuing supervision.

★ BLOCKS OF SECURITIES: We specialize in handling large blocks of securities.

HARRIS, UPHAM & CO.
Members N. Y. Stock Exchange
American Stock Exchange
Chicago Board of Trade
PHILTOWER BUILDING
TULSA, OKLAHOMA
36 Offices Coast to Coast

GOVERNMENT SALE
MINERAL ESTATE
GOVERNMENT OWNED

Bids are invited for the purchase of the eight-eights (8/8) mineral interest in and under 80 acres of land on Grand Terre Island, Louisiana, known as the Barataria Bay Light Station. The surface of this land is owned by the State of Louisiana.

This property has been screened against the known defense and other requirements of the Federal Government.

HOW, WHEN AND WHERE TO BUY

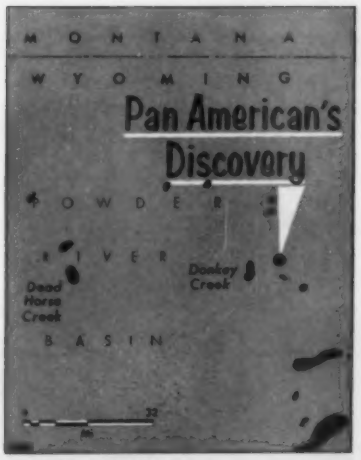
All bids must be submitted on "Invitation, Bid, and Acceptance Form No. GSA-3-322," which describes the property, states the terms and conditions of sale and necessary instructions.

Sealed bids will be received at GSA Business Service Center, Room 101, 1114 Commerce Street, Dallas, Texas, until 1:00 P. M., CST, December 16, 1958, at which place and time they will be publicly opened and read.

May be inspected at any time.

For the Invitation, Bid, and Acceptance Form, write or call GSA Business Service Center, Room 101, 1114 Commerce Street, Dallas, Texas. For further information write the office listed below or call RI—8-5611, Extension 2131.

GENERAL SERVICES ADMINISTRATION
PUBLIC BUILDINGS SERVICE
ACQUISITION & DISPOSAL DIVISION
1114 COMMERCE STREET
DALLAS 2, TEXAS



PENNSYLVANIAN OIL is reported at a wildcat on the northeast side of Wyoming's Powder River basin.

Powder River hits new deep stride

A SIGNIFICANT oil find may kick off the long-predicted push into the Pennsylvanian rocks in the Powder River basin of Wyoming.

Pan American Petroleum Corp. reported oil recovery from a wildcat in Crook County, 5 miles east of the nearest Pennsylvanian production at Donkey Creek field.

The 1 Robinson recovered 4,894 ft. of 28°-gravity oil on drill-stem test at 6,045-89 ft. On the second test at 6,089-6,111 ft., recovery was 4,342 ft. of oil. Both tests were in the Minnelusa. The well is now drilling near total depth at 6,111 ft. Pan American has full interest in the well and in about 6,000 acres in the area.

Pennsylvanian success in that portion of the basin has been sporadic in recent years. The best recent strike was at Donkey Creek. Pennsylvanian rocks are expected to be top drilling targets in Wyoming in the coming months, particularly in the Powder River and Red Desert basins.

S.D. pool opens

SOUTH DAKOTA'S third oil discovery swabbed 16 bbl. of oil per hour after acid treatment of Red River perforations. The new strike is A. L. Schlaikjer and Herb Clarkson 1 Government in E½ SE NW 23-21n-3e, Harding County. The operators are waiting for storage facilities.

The new Ordovician discovery is located in the northwestern corner of the state, 3½ miles southwest of Buffalo field, the state's first producing area. It lies on trend with the Cedar Creek anticline that comes down out of Montana and North Dakota.

put your best body forward!
BUY a Leland "Packaged Unit"
Rolling Tail Pipe
Seamless hydraulic tubing on shielded ball bearings.
Winch Mounts
for safety & strength with or without winch.
Body Deck Plate
Flush mounted, 2" center-matched hardwood and tempered steel.
Gin Pole Pockets
One piece steel casting for single or double setting.
Headache Rack
Tough, hydraulic tubing for complete protection.

For heavy duty—**anywhere in the field**—the famous Leland "Packaged Unit" is the safest, toughest, easiest, speediest all-purpose truck body. Designed and built for gin pole winching and rough terrain work, the "Packaged Unit" suits you to a "T". Write for fully illustrated catalog today.

Leland
EQUIPMENT COMPANY
Oklahoma City • TULSA • Longview, Texas
Makers of Pole Trailers—Self-loading Single Axle and Tandem Floats—Fifth Wheel Bodies

Wildcat staked south of Tucumcari

NORTHEASTERN NEW MEXICO'S recent lease play is being backed up by exploration drilling. Last week roads were being built to a remote location for the area's deep test—projected to 10,000 ft.

Sunray Mid-Continent Oil Co. 1 Ira J. Briscoe, in 31-10n-30e, 10 miles south of Tucumcari, in Quay County, is slated to 10,000 ft., or to Precambrian granite. Sunray Mid-Continent is said to hold about 20,000 acres in the area.

Location of the wildcat will explore the Tucumcari Embayment of the Palo Duro basin at a point at or near its greatest depth. Shell Oil Co. last year discovered oil on the Texas side of the basin and set off leasing and exploration.

Shell is a major lease holder in the vicinity of the proposed test, and is reported to be contributing dry-hole money.

Northeast New Mexico's deepest hole at this time is General Crude Oil Co. 1 Simpson, a Guadalupe County wildcat that found granite at 9,149 ft.

WHEELING
COUPLINGS
FOR OIL COUNTRY USE

LINE PIPE COUPLINGS A.P.I.
⅛" to 12"—Seamless and Special Processed—Black or Galvanized
PLAIN TUBING COUPLINGS A.P.I.
1" to 4"—Seamless
EXTERNAL UPSET TUBING COUPLINGS A.P.I.
¾" to 3½"—Seamless
CASING COUPLINGS A.P.I.
½" to 13⅜"—Long or Short
HYDRAULIC COUPLINGS
⅛" to 4"—Seamless
REAMED AND DRIFTED A.I.S.I.
¾" to 12"—Seamless
DRIVE PIPE COUPLINGS
6" to 12"—Seamless
PIPE NIPPLES—All Sizes and Types
STEEL BUSHINGS AND PLUGS—3,000 Lb.

WHEELING MACHINE PRODUCTS COMPANY
WHEELING, WEST VIRGINIA
WEST COAST FACTORY: WOODLAKE, CALIFORNIA

SALES OFFICES IN LEADING CITIES

Baltimore, Md.—Frank Butler, 2301 N. Charles St.
Chicago, Ill.—Harry A. Jay, Suite 1090, Old Colony Bldg.
Denver, Colo.—W. G. Cline & Co., 4500 Kalamath
Detroit, Mich.—R. W. Lang, Jr., 505 Park Avenue
Erie, Pa.—R. J. Maggi, Box 711
Falmouth, Mass.—Walter S. Bennett, 5 Belvidere Road
Grand Rapids, Mich.—R. W. Lang, Jr., 138 Burton SE
Houston, Tex.—Henry H. Paris Distributor, Inc., Box 932
Independence, Mo.—Craig A. Fross, 3701 Norwood
Long Island City, N. Y.—Max Rothenburg Co., Inc., 11-05 38th Ave.
Los Angeles, Cal.—James A. Riordan Co., 1400 Santa Fe Ave.
Louisville, Ky.—Sid Schultze Co., 849 So. 6th St.
Narberth, Pa.—Worthington-Grothaus and Assocs., 105 Forrest Ave.
Omaha, Nebr.—Wm. Freiden, Central States Engineering & Sales Co., 5101 Blondo St.
Oswego, N. Y.—Northeastern Associates, Neil Chatterton, Sec'y., P. O. Box 284
Portland, Ore.—J. G. Beard Co., 1233 NW 12th Ave.
Richmond, Va.—P. C. Abbott & Co., 15 E. Franklin St.
St. Louis, Mo.—Walter C. Dollinger Co., 4869 Goodfellow Ave.
Salt Lake City, Utah—Lovell Company, 29 E. 2nd St. South
Seattle, Wash.—Ashe & Jones, 819 Thomas St.
Wauwatosa, Wisc.—W. G. Nelson, P. O. Box 203

QUALITY-CONTROLLED PIPE COUPLINGS SINCE 1918

AN INSTRUMENT known as the Seismod, which gives an improved visual record section of seismic information without loss of character, has been developed by Sinclair Research Laboratories, Inc., Tulsa. A. C. Reid, Sinclair electronics engineer, its originator, is shown with the instrument. Seismic information is used by oil-exploration specialists in the search for underground oil-bearing formations.

New instrument aids explorers

AN INSTRUMENT to aid oil-company exploration scientists in interpreting seismic information has been developed by Sinclair Research Laboratories, Inc.

The instrument, known as the Sinclair Seismod, gives an improved visual record of seismic information without loss of character.

"This instrument," explained its developer, A. C. Reid, Sinclair electronics engineer, "facilitates making record sections that have some of the visual qualities of the variable density section, yet retains the individual reflection character of the conventional (wiggletrace) record."

This is accomplished by using the regular seismic amplitude - controlled signal to modulate a high-frequency carrier and applying this amplitude-controlled carrier to the regular seismic galvanometer.

The resulting display when developed on film or paper produces an envelope of characters which resemble a series of spools or dumbbells.

The human ability to correlate similar areas more readily than similar "crooked lines" then makes many more events and lineups apparent, other than the usual strong reflected events.

Scouts will meet in Dallas

DIRECTORS AND EDITORS of the National Oil Scouts and Landmen's Association will meet in Dallas January 9 and 10 at the Adolphus Hotel, it was announced by George Echols, president.

New officers for 1959 will be inducted into office at that time. They are: W. P. Allen, Imperial Oil, Ltd., Calgary, president; Mal Kidwell, Shell Oil Co., Abilene, Tex., first vice president; Ernest E. Allerkamp, Standard Oil of Texas, San Antonio, second vice president; W. F. Taylor, Superior Oil Co., New Orleans, third vice president; Leland Abel, Magnolia Petroleum Co., Wichita Falls, secretary-treasurer; and George Hogan, Texas Eastern Transmission Co., Corpus Christi, editor-in-chief.

Wind River's north side has oil

IMPORTANT OIL PRODUCTION was opened in Wyoming's Lost Cabin area by The California Co.

The 1 Government, C SW NW 10-38n-90w, on the extreme north fringe of the Wind River basin in an area of highly complex and faulted rocks, flowed 78 bbl. of oil in 12 hours on ¼-in. choke after treatment. Pay is the Wind River-Tertiary at 3,189-3,202 ft. and 3,204-10 ft.

This well was drilled as a tight hole and has been watched closely since spudding. It is located 7 miles east of 1 Government-Langsdorf, which pumped 32 bbl. of oil, cut 10% water. Official details on this well are still lacking, however.

Both wells are included in the Lost Cabin unit, reportedly. The field discovery well was finished last year as a gas strike in two Upper Cretaceous zones. Its success set off a flurry of activity in this nearly oil-barren north flank of the basin.

GASOLINE GAUGING PASTE

Gives accurate gauges of light hydrocarbons (Butanes, gasoline, kerosene, crudes). Turns red on contact. Will not creep up gauge line.

WATER FINDING PASTE—

Turns red on contact with water level. Assures accurate gauges.

Write
KOLOR KUT PRODUCTS CO.
Box 5415 • WAlnut 6-4780 • Houston 12, Texas

WIDCO Portable Loggers save time and money in shallow well logging

1,000 ft. Unit

2,000 ft. Unit

3,000 ft. Unit

5,000 ft. Unit (Multiple Electrode)

ELECTRIC • GAMMA RAY
TEMPERATURE • CALIPER
The most economical and efficient logging equipment for:
SHOT HOLES • CORE HOLES
SECONDARY RECOVERY
PROGRESS LOGGING
SHALLOW PRODUCTION
SOLD OR LEASED
LEASE/PURCHASE PLANS

Widco® Loggers
THE WORLD'S MOST WIDELY USED PORTABLE WELL LOGGING EQUIPMENT

WELL INSTRUMENT DEVELOPING CO. • HOUSTON
MAILING ADDRESS: BOX 282, BELLAIRE, TEXAS • CABLE: WIDCO HOUSTON TEXAS

MUD KING
THE INDUSTRY'S FINEST VALVE FOR WATER, OIL, GAS AND ALL MUD LINE SERVICES!
- Easier Operation Under Pressure
- Easier Opening and Closing
- Closes Drop-Tight without Bumping
- Fewer Parts Subject to Wear
- Easier, Faster Disassembly & Reassembly . . . without tools
- Body Remains in Line While Entire Inner Assembly Lifts Out
- Grease Chamber Encloses Threaded Parts . . . Seals Abrasives and Corrosives
- Positive Seal Under Line Pressure

DRILLING EQUIPMENT MANUFACTURING CO.
P. O. Box 4728 • Oklahoma City, Oklahoma
Export Address: 45 Rockefeller Plaza, Suite 628, New York 20, New York

TWO YEARS OF FIELD USE PROVES THE MERIT OF SLOT PERFORATION

PRODUCTION FIGURES CONFIRM THE ADVANTAGES OF LARGER HOLES

NEW WELLS

1. Production rate holds while offset wells decline rapidly on one year test
2. Fewer reworks and clean out problems
3. Less pressure while treating
4. Comparable to open hole completion

OLD WELLS

1. Old production increased from 8 to 87 bpd; production one year later 56 bpd
2. Most effective method of stimulating production since fracturing was introduced, as proved by actual figures on many wells

WATER FLOOD

1. Twenty-eight times larger entrance hole allows greater input at lower pressures. As an example a 292 bpd input well at 720 lbs. pressure was increased to 570 bpd at 460 lbs. pressure.
2. More uniform distribution of fluid.

DEMAND...

ON YOUR NEXT JOB

MORE OPERATORS ARE USING SLOTS EVERY DAY

Call or write our office for more detail information and facts.

Developed by ADVANCED OIL TOOLS, INC., Wichita Falls, Texas

General Offices 400 First National Bank Bldg.
Wichita Falls, Ph. 723-0731

South Texas Field Office, Alice, Texas
Ph. MOhawk 4-6021

Rare find in North Park basin

DISTILLATE and carbon dioxide production is reported at a wildcat in Colorado's North Park basin. The discovery well is Gulf Oil Corp. 1 Ballinger, C SW SE 8-9n-78w, Jackson County.

The well flowed 181 bbl. of distillate and 14,659 M.c.f.d. of carbon dioxide from perforations in the Dakota-Cretaceous at 5,302-21 and 5,323-30 ft. A confirmation well, 2-A Ballinger-Federal, W½ SE SW 8-9n-78w, flowed 4.3 bbl. of distillate and 2 M.M.c.f.d. of carbon dioxide on drill-stem test at 4,965-5,015 ft. This new field is 1½ miles east of North McCallum field in north-central Colorado.

Gas pool found in Ashtabula

A WILDCAT GASSER was brought in by Beldon and Blake in northeastern Ashtabula County, Ohio.

The test is on W. Runyan, Lot 7, Kingsville Township, 2½ miles southeast of the village of South Kingsville. Clinton sand was found at 3,053-3,137 ft., and was fractured. The gas gaged 3,690 M.c.f.

Strikes reported in Illinois basin

TRISTATE exploratory news last week included discoveries in Gibson County, Indiana; Saline, Effingham, and Jefferson counties, Illinois; and Ohio, Union counties in Kentucky.

Indiana . . . A new Cypress sand discovery in Gibson County is on pump for production tests after swabbing 20 bbl. per hour. The new strike is Highland Oil Co. 1 Willard Winget, SW SE NE 21-2s-9w, 4 miles west of Oakland City. The Cypress is at 1,498-1,521 ft.

Illinois . . . In Saline County, 6 miles north of Harrisburg, Louis Kapp 1 Tate Unit, NE NE NE 16-8s-6e, is a new-pay discovery for the area. The well got oil on drill-stem test of the Aux Vases at 2,944-76 ft.

In Effingham County, 7 miles southwest of Dietrich, Jet Oil Co. 1 Blunt pumped 150 bbl. of oil daily from the McClosky at 2,871-76 ft., natural. Location is in NW NE NE 20-6n-7e.

Jefferson County's new strike is E. & G. Drilling Co. 1 Harvey Keneipp, 5-1s-3e, 2 miles south of Kell. Recovery on drill-stem test of the McClosky at 2,610-15 ft. was 1,920 ft. of gas and 600 ft. of oil. Casing is set to test at 2,611-15 ft.

Kentucky . . . J. C. Miller Oil Co. 1 Charley Harrel, 3-K-30, 3 miles west of Centertown in Ohio County, pumped 200 bbl. of oil per day on completion from the McClosky at 2,198-2,204 ft.

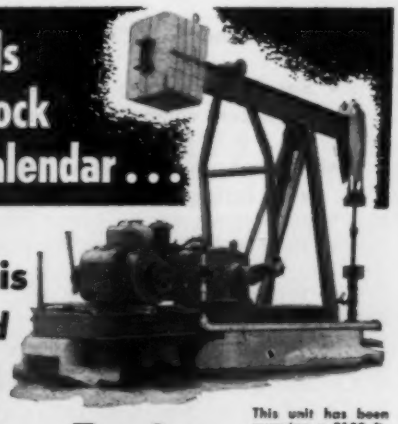
In Union County, Sun Oil Co. is testing the McClosky at 2,751-68 ft. at 1 Rob Waller in 11-P-18. This Wabash Island test got oil on a drill-stem test of the McClosky at 2,745-55 ft. It is a new pay for the area.

Watch this deep Chaves wildcat

A DEEP WILDCAT in southeastern Chaves County, New Mexico, had prospects of opening Pennsylvanian gas production near the rim of the buried Capitan reef zone. The well is G. E. Hall, Midland, 1-G State, in NW SE 22-10s-31e, 44 miles east of Roswell.

Production tests on Pennsylvanian perforations between 10,460-10,620 ft. produced gas at the daily rate of 5 M.M.c.f., under 240 psi. flowing tub-

Pumping Oil Wells Around the Clock and Around the Calendar . . .



a "Natural" for this *Specially Designed*

WISCONSIN Oil Well Pumping Engine

This unit has been pumping a 2100 ft. well for the past 2½ years.

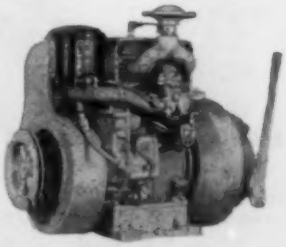
Pumping oil wells day in and day out, month after month, year after year . . . calls for everything an engine has got in terms of heavy-duty stamina, all-weather operating dependability and complete adaptability to variable load service.

When the power load varies from zero to maximum at the rate of 10 to 25 times a minute, which is common on oil well pumping jobs, you need an engine that automatically compensates for this rapidly changing load. You need steady power that rolls with the punch . . . and that's what you get with the Wisconsin Model THPD Oil Well Pumping Engine.

One of the outstanding features of this specially designed engine is its built-in HIGH MOMENTUM FACTOR. This is accomplished through the use of *multiple flywheels*. In addition to the standard cooling flywheel at the cranking end of the engine, an extra-heavy (80 lb.) flywheel is mounted on the take-off end of the crankshaft. This practically *triples* the Momentum Factor (WR^2).

Additionally, an oversize heavy-duty industrial dry type clutch is furnished as standard equipment. This assures long clutch life (to match the engine) under the terrific shock of constantly fluctuating loads that are encountered in oil well pumping.

This is only half of the story. For full details, about the Model THPD Wisconsin Engine, contact the Harley Sales Company's nearest office.



Model THPD 2-cylinder, 18 hp. Wisconsin Heavy-Duty Air-Cooled Oil Well Pumping Engine with high momentum factor.

WISCONSIN MOTOR Corporation
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

WRITE TO HARLEY SALES CO.
619 SOUTH MAIN STREET • TULSA, OKLAHOMA
3420 McKINNEY AVENUE • HOUSTON, TEXAS
909 SOUTH MAIN STREET • WICHITA, KANSAS
OIL FIELD DISTRIBUTORS FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS

A8-6075

You're Paying for W-S Quality...

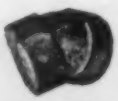
BE SURE YOU GET IT!

W-S Forged Steel Fittings fit the pattern of all top quality products. The best costs no more in the long run. In terms of trouble and inconvenience, second-best will always be expensive. These are the reasons why you are money ahead to insist on C-1025 W-S Fittings.

- **Low carbon C-1025 steel insures optimum weldability.**
- **Special bar quality steel for density, strength, and consistent composition. Install 'em and forget 'em.**
- **Steel physicals excel ASTM specs for forged steel fittings.**
- **Heat coded to insure identification.**
- **Made in our own Forge Shop.**
- **Full control of quality to produce "Best in Industry!"**

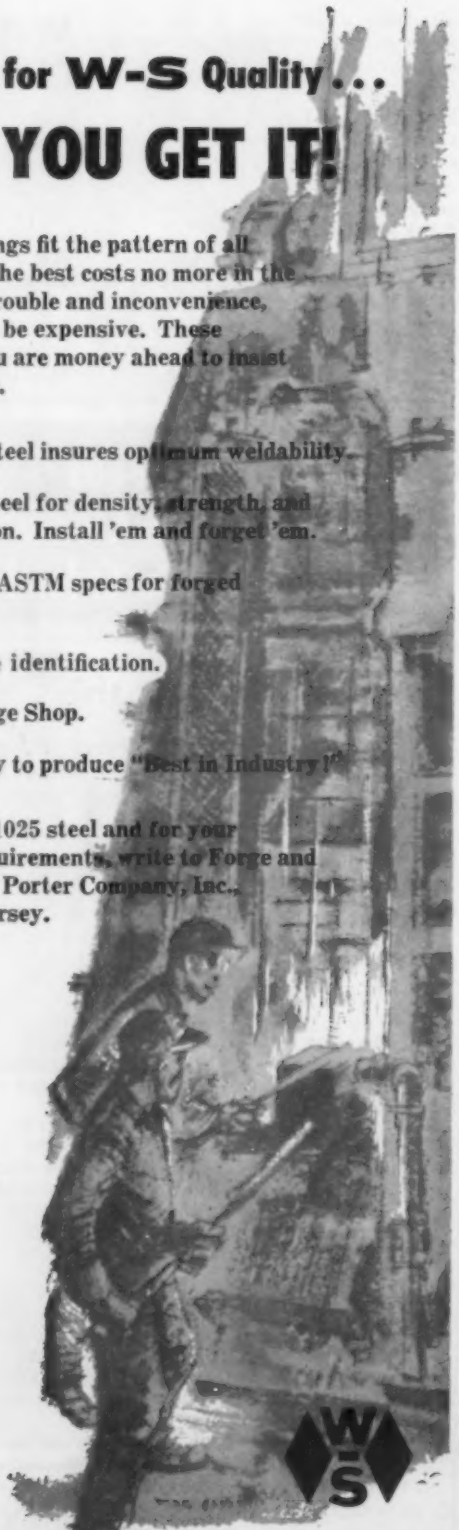
For information about 1025 steel and for your commercial forging requirements, write to Forge and Fittings Division, H. K. Porter Company, Inc., Box 95, Roselle, New Jersey.

ROUGH FORGING BEFORE TRIMMING



ROUGH FORGING AFTER TRIMMING

FINISHED FITTING



H. K. PORTER COMPANY, INC.

FORGE AND FITTINGS DIVISION

W-S Fittings Works, Roselle, N. J. • Cleveland Forge Works, Cleveland 4, Ohio
Stainless Steel Works, Duncannon, Pa.

ing pressure. The section had been washed with 500 gal. of mud acid, and treated with 2,000 gal. of regular acid. Testing continued.

No. 1-G State was started as a Devonian exploration. It reached total depth of 11,753 ft., entering the Devonian at 11,715 ft. on elevation of 4,372 ft. Drill-stem tests in the Devonian returned salt water.

The discovery is thought to be Chaves' County's first Pennsylvanian production. It is 6 miles west of Pennsylvanian production in Mescalero field, Lea County. Operators of the new prospect are also happy over its location next to El Paso Natural Gas Co.'s 30-in. Permian-San Juan Crossover pipeline, which passes about ½ mile from the well.

Morrow gas flows at Bell Lake

CONTINENTAL OIL CO. 5 Bell Lake in Lea County, New Mexico, has been completed as a Morrow (Pennsylvanian) gas well. Potential was at the rate of 7,400 M.c.f.d. of gas flowing through open 2-in. tubing. Flowing pressure was 1,000 psi.

Flowing through choke, under pressure of 2,500 psi., the daily rate was 6,600 M.c.f. Shut-in tubing pressure was 6,603 psi.

Production is from the fourth Morrow sand, through perforations at 14,417-54 ft. Completion was effected after washing the section with 1,000 gal. of mud acid.

While drilling, the first Morrow sand was believed to hold good prospects. Later tests returned only salt water and drilling mud.

Total depth was 16,100 ft. It picked top of the Devonian at 15,962 ft., on elevation of 3,656 ft. The Devonian carried water.

The 5 Bell Lake is in SW NE 1-24s-34e, ¾-mile west of 4 Bell Lake, a Devonian gas producer. It is said to be the first test on the Bell Lake unit to be drilled on the flank of the structure. Near the base of the Morrow it was almost 700 ft. low, structurally, to 4 Bell Lake.

New field opens in Calcasieu Parish

A CONDENSATE FLOW of 390 bbl. per day was gaged in a new discovery well completed by The California Co. in southern Calcasieu Parish, southwestern Louisiana.

Flow was through 7/32-in. choke with pressure of 6,900 psi. Gravity of the condensate was 48.5°. Gas

flow was in the ratio of 10,410 cu. ft. per barrel of liquid.

The well, 1 Noble et al. 3, is completed in Frio pay at 11,564-84 ft. after being drilled to 12,045 ft.

Nearest previous production is at Pine Ridge, 3 miles north. The latter field, discovered in 1954, has two wells with pays at 9,300 and 11,200 ft. There is a dry hole between the new well and that field. The older Bayou Choupeque, discovered in 1946, is 4 miles southeast. It produces from Anahuac sands at 8,500 to 8,800 ft.

Shallow sand added to Lake Salvador

A RELATIVELY SHALLOW SAND is being added to the productive zones in the Lake Salvador area, in Lake Salvador, on the Lafourche-St. Charles parish line.

The new pay is a newly completed well drilled jointly by Mississippi River Fuel Corp., Hope Natural Gas Co., and Brilch Oil Co. on their State Lease 3069.

Completion is from perforated interval at 4,819-26 ft. Its flow through 3/32-in. choke was at the rate of 59 bbl. of 34.7°-gravity oil per day with pressure of 550 psi. and gas-oil ratio of 171 cu. ft. per barrel. Total depth is 11,500 ft.

Location is southeast of a south extension well the same operators completed about a year ago. The latter, on State Lease 3068, is a dually completed gas-condensate well in sands at 10,080-81 ft. and 11,237-42 ft.

Both extension wells are in Lafourche Parish. The main Lake Salvador field, discovered in 1940, is in St. Charles Parish. It now has 39 wells with production from multiple sands from 6,700 to 10,600 ft.

Dual gas discovery in Freestone County

FREESTONE COUNTY, East Texas, had one dual gas discovery completed, and another showing as a discovery with potential tests ready to get under way.

The completion is Jack L. Phillips, Gladewater, 1 Richardson-Henry Unit, 5 miles east of Fairfield. Estimated open flow from Woodbine sand between 4,616-18 ft. was at the rate of 56 M.M.c.f.d., plus 6 bbl. of condensate per 1 M.M.c.f. The well was reported to have logged 12 ft. of indicated pay sand in the Woodbine.

Estimated open flow from the sub-Clarksville at 4,223-31, and 4,233-37 ft. was at the rate of 800 M.c.f. of gas, plus 12 bbl. of condensate.

Location of the well is in the J. Korn Survey, A-15. It is 1½ miles west of sub-Clarksville gas production in Nan-Su-Gail field, and operators probably will classify the well as in that field, and ask for discovery allowable from the Woodbine sand.

Smackover wildcat set . . . The Grelling estate has made location for a 10,400-ft. Smackover wildcat in northeastern Hopkins County. The project is 1 Tom Worsham, 6 miles due south of Sulphur Bluff, on a 100-acre lease in Charles Thompson Survey, A-1142.

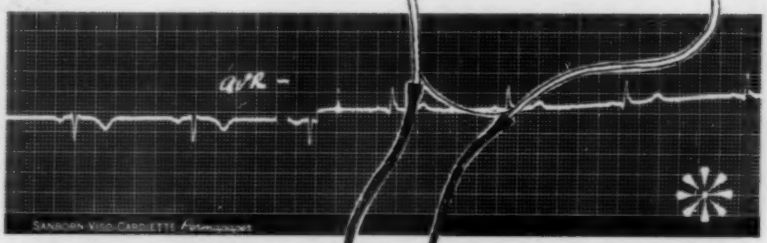
Nearest production is from the Paluxy, in Sulphur Bluff field, 3 miles to the north. Location is 4 miles south of Grelling estate 1 Bassham, Smackover discovery in the area, which flowed an estimated 13 M.M.c.f.d. of gas, plus 80 bbl. of condensate per 1 M.M.c.f. of gas from perforations at 9,324-29 ft.

In October—two pools, two pays

EXPLORATION EFFORTS in the East Texas area opened two pools, plus two new pay zones in proved fields. Included in the discoveries was a rich gas-condensate well at Bethel salt dome in Anderson County.

Pool openers . . . West Mt. Vernon field is the name given F. R. Jackson

look to the **HEART!**



HUMAN OR MECHANICAL

IT MUST BE

STRONG, DEPENDABLE

AND HEALTHY

smooth running . . . with remarkable endurance in any weather to handle changeable loads . . . WISCONSIN conservatively rated, heavy duty engines are healthy "mechanical hearts" for constant, economical service to power your equipment.

WE HANDLE THE COMPLETE LINE OF **WISCONSIN** *AIR-COOLED ENGINES AND PARTS . . .* **3 hp. to 56 hp.**

CONTACT YOUR NEAREST DEALER OR

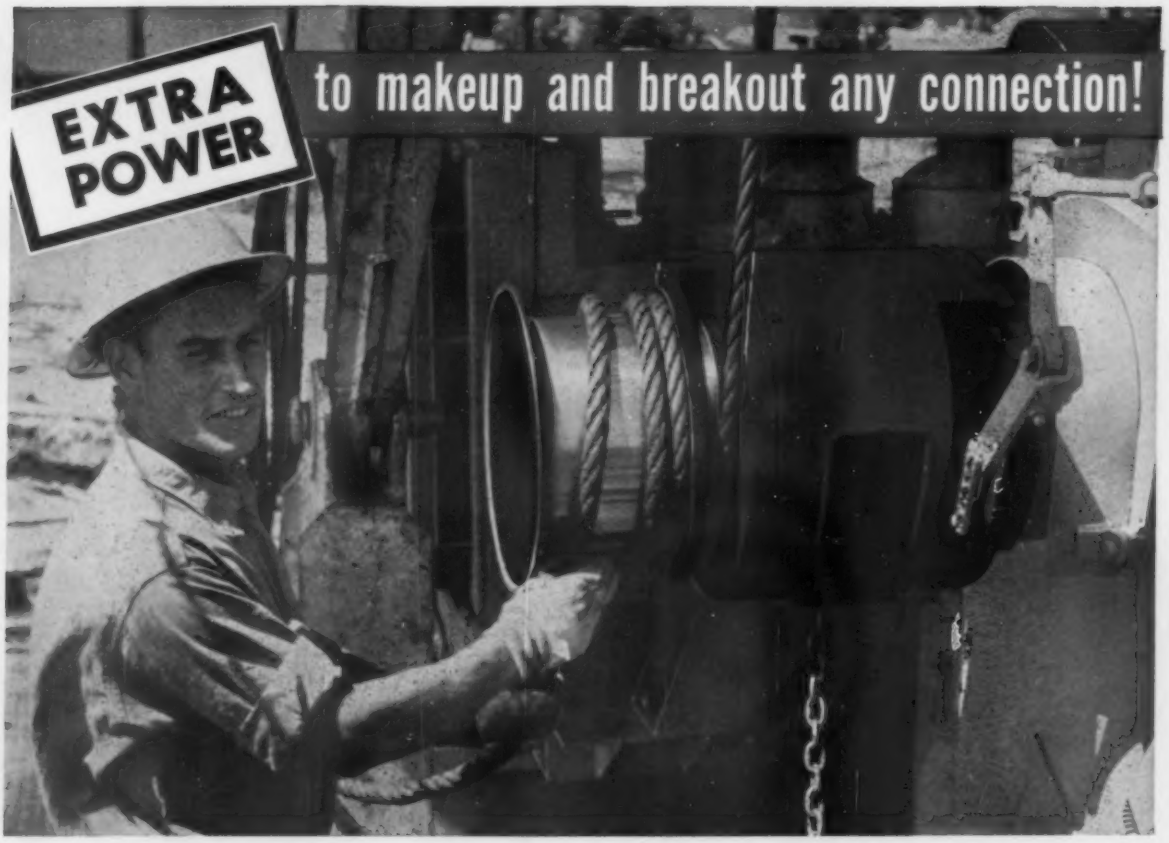
HARLEY

SALES COMPANY

WICHITA TULSA HOUSTON

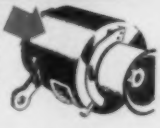
The above EKG is an actual reproduction of a sound human heart. If such data for a WISCONSIN engine could be so plotted, the resemblance to this sound power plant would be striking.

not on order... but on the way!



Why AMERICAN IRON Universal "55" is the friction CATHEAD for your drawworks!

EXTRA SAFETY!
Safety stationary guard (encloses all mechanism).



Rope divider is mounted to the safety guard.

Designed for use on ANY SIZE drawworks, the American Iron "55" Cathead gives you extra power and extra safety when and where you need it. In addition, you get many outstanding advantages when you specify the Universal "55" **HERE ARE A FEW:**

- SIMPLE and QUICK installation.
- PRE-ADJUSTED at factory.
- SMALLER overall dimensions.
- SPIN and TONG with positive control.
- Both AIR and MANUAL controls available.
- NO SHOCK, on engagement and release.
- REMOVABLE STEEL SPOOL . . . more road clearance.

Your American Iron Sales Representative will be happy to explain these and the many additional advantages.

Available through your Supply Store
BE SURE IT'S THE BEST . . . SPECIFY AMERICAN IRON

AMERICAN IRON & MACHINE WORKS CO. INC. A OKLAHOMA CITY

Another AMF Product
PETROLEUM EQUIPMENT

AMERICAN IRON & MACHINE WORKS COMPANY, INC.
518 North Indiana Avenue • Oklahoma City, Oklahoma
Subsidiary of AMERICAN MACHINE & FOUNDRY COMPANY

and S. H. Killingsworth 1 Parchman Moore Unit, in eastern Franklin County.

The well pumped 178 bbl. of 38° oil a day, with no water, from Pettet limestone at 7,003-09 ft. The discovery is about 1 mile southwest of similar production in Mt. Vernon field.

East Bethel Dome was opened by W. D. McBee and Associates 1 Adam Cone, Jr. gas unit. It had an unusually heavy liquid yield, making 173 bbl. of 53° condensate per 1 M.M.c.f. of gas, for a gas-liquid ratio of 5,800:1. Gas potential was a calculated 4,600 M.c.f., open flow. Final perforations were in Rodessa at 9,793-9,839 ft.

The East Bethel discovery is on the east side of the known limits of the salt structure, and about 2 miles east of nearest Rodessa gas production in Bethel field.

New horizons . . . Oil production has been added to the Caledonia gas area in southern Rusk County at F. R. Jackson 1 Pincham. The well completed for 52 bbl. of 42° oil a day, flowing through ¼-in. choke. Perforations were at 6,056-64 ft. Gas-oil ratio was 576:1. The new well is about a ¾-mile-northwest outpost to the gas field.

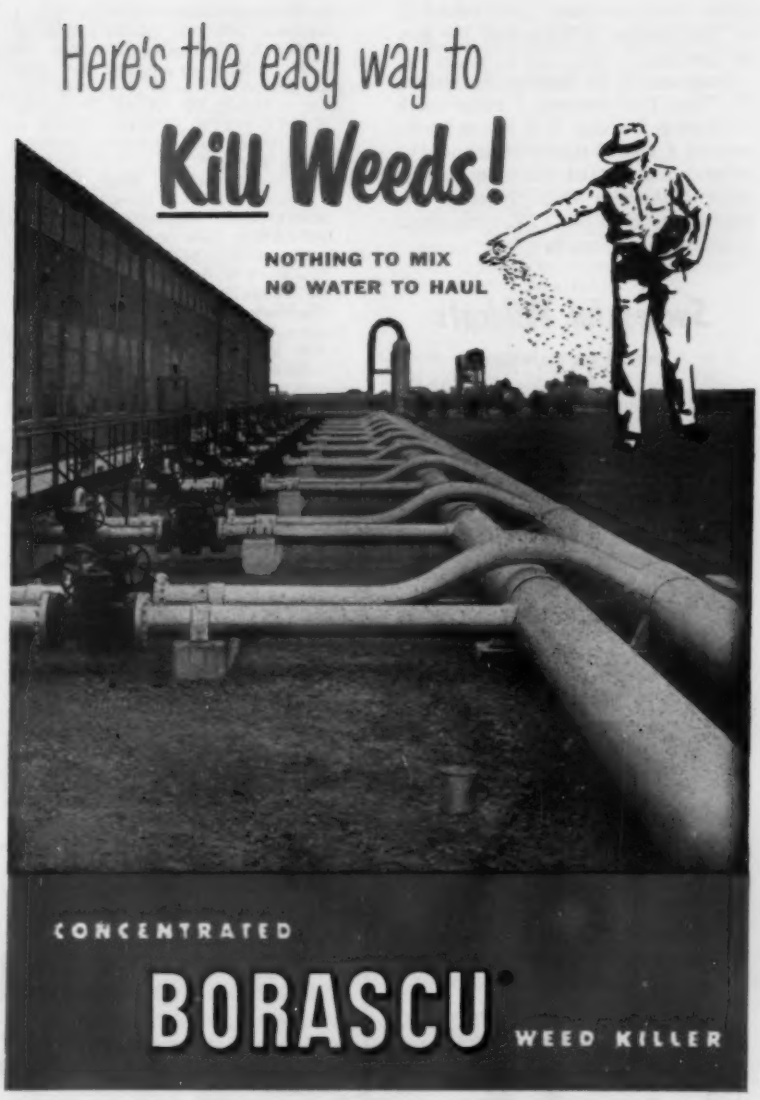
In the Quitman field of northern Wood County, Delta Drilling Co. 5 G. A. Blalock completed as a dual well. The new horizon was the Blalock sand, or Lower Hill which is Rodessa in age. Potential was 226 bbl. of 63.5° oil through ¼-in. choke, under casing pressure of 2,500 psi. Gas-oil ratio was 6,227:1. Potential from the field's regular pay was 196 bbl. of oil a day through 10/64-in. choke, from Rodessa at 8,352-60 ft.

Devonian strike in Ector completed

NORTHWESTERN Ector County's Devonian discovery, and Permian pay extension has been completed in the deeper zone. Operators will attempt dual completion from the Wichita Albany section.

The discovery is W. R. Goddard et al., Midland, 1 Jessie Williamson. Devonian potential was 457 bbl. of 38° oil a day through 20/64-in. choke. Gas-oil ratio was 928:1. Casing pressure was 450 psi. Production was from perforations at 8,002-52 ft., following acid treatment of 10,000 gal., and fracture treatment with 20,000 gal.

During drilling, the well also promised production from a section



.....prevents regrowth—one application may keep area clear of weeds and grasses for 1 or 2 years!

This weed killer gives lasting control of fire-hazardous vegetation... and that's what you need in the Petroleum Industry. Low cost, easy application, safety and convenient packaging are other important features you get with Concentrated BORASCU. Use it anywhere, in any climate, to destroy weeds. Concentrated BORASCU is nonpoisonous, nonflammable, and noncorrosive to ferrous metals... try it!

WRITE FOR DETAILS!

United States Borax & Chemical Corporation
PACIFIC COAST BORAX COMPANY DIVISION
630 SHATTO PLACE • LOS ANGELES 5, CALIFORNIA

DISTRIBUTORS LOCATED THROUGHOUT OIL FIELDS OF U.S.A., CANADA, MEXICO, COLOMBIA, VENEZUELA

of the Wichita Albany at 6,790-6,957 ft. This section is scheduled for further testing.

Location is in Section 18, Block 45, T1n, T&P Survey, 7 miles north of Notrees townsite. It is 1 mile northwest of a 10,036-ft. dry hole and 1¼ miles northwest of Permian pay in West Goldsmith field. Nearest Devonian pay is in the TXL area, about 2 miles to the south.

Successful Wildcats

WESTERN CANADA

Alberta, Shell-Canadian Superior 8-30-32-2 Barrie Lake, LSD 8, 30-32-2w5. Cardium oil discovery. TD 9,970 ft.

Kidd-Charter 10-9-43-12 Sedgewick, LSD 10, 9-43-12w4. Glauconitic gas discovery. TD 3,210 ft.

Saskatchewan: Shell 7-10-8-11-2 Innes, LSD 7, 10-8-11w2. Mission Canyon oil discovery. TD 4,346 ft.

KANSAS

Haskell County: United Producing Co. 2 J. D. G. Stuckey, C NW NE 29-28s-34w. IP 207 BOPD, Lansing 4,535-45 ft., Mississippian 5,460-70 ft. TD 5,480 ft. New pay in Eubank field.

W. J. Coppinger 1 Collingwood, C NW NE 8-29s-34w. IP 321 BOPD, Chester 5,433-45 ft. TD 5,650 ft. New pool.

Morton County: Panhandle Eastern Pipe Line Co. 1-2 Moore "C," C NW 2-33s-41w. IP 1,500 M.c.f.d., Topeka 3,177-86 ft., 3,205-10 ft., 3,235-42 ft. TD 5,253 ft. New pay in Richfield pool.

Norton County: Jocelyn-Varn Oil Co. 1 Jocobson, NW NW NE 34-5s-21w. IP 19 BOPD, 22°, Topeka 3,374-78 ft. TD 3,702 ft. New pay in West Ray pool.

Pawnee County: McKnab Producing Co., Inc. 1 Unruh, SE NE SE 30-21s-15w. IP 2,000 M.c.f.d. Arbuckle 3,903-98 ft. TD 4,000 ft. Shut-in gas well. Discovery of Jap pool.

Rawlins County: Jackson, Shear & Parker 1 Bowles, C SW SW 24-4s-34w. IP 115 BOPD, 35.9°, Marmaton 4,430-36 ft. TD 4,850 ft. New pool.

Rooks County: I. O. Miller 1 Bertha Holmes, SW SE NW 4-9s-20w. IP 17 BOPD, 29°, Arbuckle 3,751-72 ft. TD 3,772 ft. Discovery of East Arpin pool.

Reserve Drilling Co. 1 Graham, NW SE NW 29-9s-20w. IP 100 BOPD, 29°, Arbuckle 3,859-66 ft. TD 3,866 ft. Discovery of West Kerns pool.

Russell County: K&E Drilling Co. and Benedict 1 Machin, NW NW SE 4-13s-14w. IP 135 BOPD, 38% basic sediment and water, 37°, Lansing 2,994-99 ft. TD 3,262 ft. Opens Machin pool.

Saline County: George Hess 1 Van Meter, NW SE SE 32-16s-1w. IP 30 BOPD, 100 BWPD, 34.5°, Kansas City 2,064-72 ft. TD 2,675 ft. New pay in Gypsum Creek pool.

Seward County: Cabot Carbon Co. 1 Nellie Burr, 4-33s-31w. IP 171 BOPD, 38°, Des Moines 5,031-41 ft. TD 5,990 ft. New pay in Massoni field.

Cabot Carbon et al. 2 Adamson, C NE SW 11-34s-34w. IP 25,000 M.c.f.d., Chester 6,330-6,400 ft. TD 6,400 ft. New pool.

Sherman County: Phillips Petroleum Co. 1 Hartley "A," C SW SE 3-6s-37w. IP 345 BOPD, 39°, Marmaton 4,585-88 ft., 4,635-40 ft., 4,664-70 ft. TD 5,356 ft. New pay in Llanos field.

Phillips 2 Llanos, C SW NE 10-6s-37w. IP 120 BOPD, 2 BWPD, Lansing-Kansas City, 4,456-62 ft., 4,474-90 ft. TD 5,000 ft. New pay in Llanos field

Sumner County: A. F. Brann 1 Wusk, NE NE NW 18-31s-1w. IP 39 BOPD, 7% basic sediment and water, 43°, Mississippian 3,711-17 ft. TD 3,717 ft. Discovery of Wusk pool.

Globe Oil & Gas Co. 1 M. A. Johnson, 1-34s-1e. IP 133 BOPD, 40°, Simpson 3,960-72 ft. TD 4,110 ft. Discovery of Badger Creek pool.

SOUTH LOUISIANA

Ascension Parish: Austral Oil Co., Inc., 1 Fridge et al., 4-10s-4e, 1½ miles northwest of Sorrento field. IP 3,350 M.c.f.d. and 5 BO per M.M.c.f., 7/32-in., TP 3,300 psi., perf. 9,973-77 ft. TD 11,318 ft. New-field discovery well.

Beauregard Parish: Russell Maguire 2 Crawford, 16-4s-12w. IP 66 BOPD and 517 M.c.f.d., 9/64-in., 51°, TP 7,846 psi., perf. 10,668-78 ft. TD 10,746 ft. New pay in Alligator Lake field.

Terrebonne Parish: Mississippi River Fuel Oil Co. and Hope Natural Gas Co. 2-E LL&E, Township 23s-16e (secs. unsurveyed). IP 72 BOPD and 2,440 M.c.f.d., $\frac{5}{8}$-in., 51°, TP 2,900 psi., perf. 10,026-46 ft., 91 BOPD and 3,590 M.c.f.d., 7/32-in., 51°, 2,950 psi., and 42 BOPD and 3,100 M.c.f.d., ¼-in., 57°, 2,000 psi., perf. 9,823-26 ft. TD 11,950 ft.

MICHIGAN

Allegan County: Muskegon Development Co. 2 Nienker, NW SE SW 16-4n-13w, Salem Twp., Salem pool. IP 260 M.c.f.d., 1,600 gal., Detroit River pay 1,996-2,000 ft. TD 2,390 ft. New pay in Salem pool.

Ogemaw County: W. L. Harvey 1 State, SW

"Just half a tank, sir. I don't want it to orbit."

D&S TRUCO TRI-DIA Diamond Bits

Give Highest Recovery CORES that you need for . . .

- Porosity in detail.
- Pin-point the pay zone permeability.
- Accurate analysis of available reserves.
- Valuable aid in electric logging interpretation.
- Reliable well completion zone information.
- Substantiation of reserves for bank financing.
- Vital details for secondary recovery work.
- Selective Acidizing.
- Selective Perforating.
- Accurate information in hard or soft formations.

TRUCO DIAMOND BITS
Drilling & Service INC.

DIAMOND DRILLING EQUIPMENT
6210 NORTH CENTRAL EXPRESSWAY | DALLAS, TEXAS
OFFICES IN ALL PRINCIPAL OIL AREAS
Ultra Fine Diamond Equipment for the Oilfield

NE SW 10-22n-1e, Ogemaw Twp., 1½ miles northwest of West Branch pool. IP 18 bbl., 3,500 gal., 3,994-4,005 ft., 4,304-64 ft. TD 4,381 ft. Extension to West Branch pool.

St. Clair County. Fisher-McCall, Inc. 1 Taetz, SE SE SW 31-4n-15e, 3½ miles southwest of Peters-Casco pool. IP 100 BOPD, pinched after 1,000 gal. acid. A-1 Salina pay 2,559-60 ft. TD 2,562 ft. New pay in Boyd gas field.

SOUTHEAST NEW MEXICO

Chaves County: The Texas Co. 1 Peery Federal, 29-15s-30e, 13 miles northwest Maljamar. IP 1,053 BOPD, 24/64-in. choke, 55°, TP 800 psi., Devonian 11,050-11,134 ft.; IP 1,096 M.c.f.d., ½-in. choke, plus 28 BCPD, Ellenburger 12,068-12,106 ft. TD 12,298 ft. Dual discovery.

Lea County: Gulf Oil Corp. 6-B Vinson Ramsay, 36-25s-37e, 5 miles southeast Jal. IP 274 BOPD, 12/64-in. choke, 37.9°, GOR 807:1, TP 725 psi. perf. 5,359-5,493 ft. TD 5,800 ft. New pay.

OHIO

Ashtabula County: Belden and Blake 1 W. Runyan, Lot 7, Kingsville Twp. IP 3,690 M.c.f.d. Clinton 3,127-37 ft. TD 3,191 ft. Gas pool discovery.

Holmes County: Baldwin Realty Co. 1 Melvin Keifaber, Sec. 24, Clark Twp. IP 7 BOPD, Clinton 4,197-4,205 ft. TD 4,342 ft. Oil discovery.

OKLAHOMA

Greer County: Columbian Fuel Corp. 2 J. C. Johnson, SW SW NE 26-6n-22w. IP 500 M.c.f.d. lime and dolomite and sandy shale 634-76 ft. TD 683 ft.

Harper County: Pan American Petroleum Corp. 1-A Bardy Unit, SE¼ 23-27n-26w. IP 7,114 M.c.f.d. Morrow 6,674-78, 6,681-85, 6,694-98 ft.; Chester 6,733-38 ft., 6,742-47, 6,780-86 ft. TD 7,014 ft. New gas field.

Kay County: Artnell Co. 1 Brandon, SE SW SE 26-28n-2e. IP 25 BOPD, 125 bbl. salt water, 42°, Cleveland 3,053-63 ft. TD 3,592 ft.

Kiowa County: Ramsey Petroleum Corp. 1 Opperman, SW SE SW 31-7n-16w. Shut-in gas well. TD 857 ft.

Lincoln County: Great Plains Petroleum Co. 2 E. Johnston, SE SW SW 29-14n-5e. IP 10 BOPD, 185 BWPD, 40°, Prue 3,610-19 ft. TD 3,619 ft.

Logan County: T. P. Petroleum Corp. 1 Mary Wasco, NE NE NE 6-15n-4w. IP 552 BOPD, 41.7°, Mississippian lime 6,610-6,848 ft. TD 6,970 ft.

Major County: Pan American 1 Hutchinson Unit "B," C NE SW 32-22n-15w. IP 1,206 M.c.f.d., Chester 7,367-79 ft.; Cherokee 7,146-50 ft. TD 8,363 ft. Shut-in gas-discovery well.

McClain County: R. G. Lawton 1 J. H. Hedrick, C NW SE 16-5n-3w. IP 183 BOPD, 45°, Hunton 8,310-42 ft. TD 8,781 ft.

Cooperative Refinery Assoication 1 Crawford "A," NE SW SE 7-6n-2w. IP 73 BOPD, 18 BWPD, 40°, Hunton 8,069-8,105 ft. TD 9,792 ft.

Stephens County: Tom Jack 1 Scott, SW NE NE 15-3s-4w. IP 288 BOPD, 44.5°, Third Heevner 2,372-2,450 ft. TD 2,503 ft.

Texas County: Phillips Petroleum Corp. 2 Pearl, C NW NW 16-1n-15eCM. IP 23,200 M.c.f.d., Marmaton 5,740-48 ft., 5,760-72 ft. TD 8,336 ft. New gas field.

Woodward County: Pan American 1 Dean, C SW NE 3-21n-21w. IP 36 BOPD, 45.63 BWPD, 38°, Tonkawa 6,626-30 ft TD 9,257 ft.

NORTH TEXAS

Baylor County: Burk Royalty Co. 1 Richardson, Sec. 2463, TE&L Sur., 2 miles east Westover. IP 115 BOPD, 10/64-in. choke, 40°, TP 360 psi., GOR 550:1, Caddo 4,849-59 ft., open hole. TD 4,859 ft.

Jack County: Phillips Petroleum Co. 1 Arron, Sec. 2, A-2027, SPRR Sur., 1 mile southwest Bowie field, separated by dry holes. IP 373 BOPD, 43°, GOR 549:1, Atoka conglomerate 5,958-68 ft. TD 6,050 ft., elev. 1,150 ft.

Wise County: Southern Union Gas Co. 1 Martin Unit, Dallas CSL Sur., A-237, 1½ miles southeast Alvord. IP 231 BOPD, 42°, GOR 173:1, conglomerate 5,844-52, 5,932-40 ft. TD 6,267 ft., elev. 871 ft.

Wise County: Lone Star Producing Co. 1 Craft Water Board Unit 16, 5 miles southwest of Bridgeport, ½ mile northwest of gas production. IP, open flow, 1,100 M.c.f. gas, GOR 111,000:1. Bend conglomerate 5,224-32, 5,317-26 ft. TD 6,100 ft.

SOUTHWEST TEXAS

Dimmit County: Sun Oil Co. 1 Straus, Henry Eicke Sur., A-1258, 8 miles southwest of Carrizo Springs. AOF 12,800 M.c.f.d., GLR 566 M.c.f. per barrel, 37.7°, shut-in TP 1,285 psi., perf. 2,964-69 ft., Navarro-Olmos sand. TD 3,600 ft. New field.

TEXAS GULF COAST

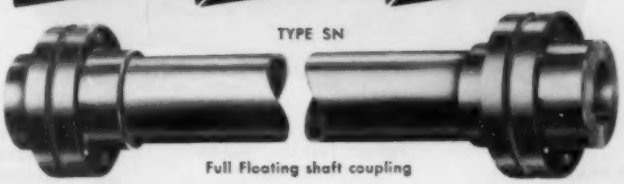
Calhoun County: Blanco Oil Co. et al. 1 Lockwood, Andrews & Newman, Miguel Castillo Sur., A-7, 2 miles northwest of Seadrift. IP 196.07 BOPD, 9/64-in., 45°, GOR 1,020 cu. ft. per barrel, TP 1,450 psi., perf. 7,826-30 ft., Frio. TD

Protect Your Machinery with

THOMAS FLEXIBLE COUPLINGS

ALL METAL

NO LUBRICATION · NO MAINTENANCE · NO WEARING PARTS



Full Floating shaft coupling

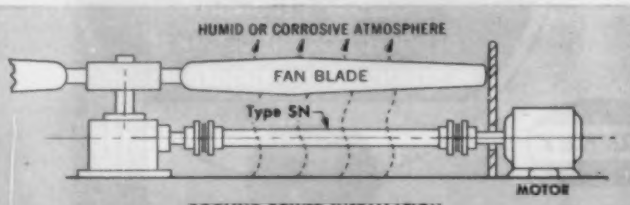
REFINERS! PIPE LINE MEN! DRILLING ENGINEERS! LABORATORY TECHNICIANS!

Thomas Couplings are used to advantage on Pumps, Compressors, Cooling Towers, Rigs or any other tough job where continuous operation and dependability are required.

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance



COOLING TOWER INSTALLATION

In the typical cooling tower installation shown above, the motor — outside the humid or corrosive atmosphere — is connected by a floating-shaft coupling to the gear box under the large slow-speed, horizontal-blade fan.

Write for engineering catalog 51A, and the name of your nearest Thomas representative

THOMAS FLEXIBLE COUPLING COMPANY

WARREN, PENNSYLVANIA, U.S.A.

new

redesigned

BONNEY THREDOLETS

IMPROVED FORGING TRIM AVOIDS NOTCH EFFECT, ENHANCES APPEARANCE

THICKER WALL PREVENTS THREAD DISTORTION CAUSED BY WELDING

FULL PENETRATION WELD ASSURED BY SHARPER LAND ON WELD BEVEL

PERFECT THREADS, THANKS TO MODERN MANUFACTURING EQUIPMENT

REDUCED WELDING SPEEDED INSTALLATION —RESULTING FROM CHANGED SHAPE, CLARIFYING WELDLINE WITH SHARPENED BEVEL

SPECIFY AND USE BONNEY THREDOLETS AND SOCKOLETS FOR ALL BRANCH CONNECTIONS 2" AND SMALLER

DROP FORGED FOR STRENGTH
FLARED FOR FLUID FLOW
BEVELED FOR WELDING
SHAPED FOR QUICK FIT
PRICED FOR ECONOMY
DESIGNED FOR THE ULTIMATE IN STRENGTH AND RUGGEDNESS

BONNEY

WELDOLETS®
THREDOLETS®
SOCKOLETS®
ELBOLETS®
BRAZOLETS®

CARBON STEEL
STAINLESS
ALLOY
for all services

BONNEY FORGE AND TOOL WORKS

ALLENTOWN, PENNSYLVANIA

8,520 ft. New-field discovery north of San Antonio Bay field.

TEXAS PANHANDLE

Ochiltree County: Shell Oil Co. 1 J. H. Kershaw, 5 miles northeast of Perryton and 4½ miles east of Perryton field, Sec. 46, Blk. 10, HT&B Sur. IPP 64 BOPD, Morrow 8,142-64 ft., 37°; Chester IP 10,200 M.c.f.d. plus 24½ PD per millon. 8,305-19 ft. TD 8,454 ft.

WEST CENTRAL TEXAS

Fisher County: Tex-Harvey Oil Co. 1 Dozier, Sec. 14, Jones & Leggets Subd., Bastrop CSL Sur. 322, 1 mile southwest Sylvester. IP 20 BOPD, 20/64-in. choke, 46°, GOR 1800:1, TP 80 psi., Goen sand 5,456-60 ft. TD 6,391 ft., ground elev. 1,908 ft. Top Ellenburger 6,053 ft., Cambrian 6,368 ft.

Jones County: Fletcher Oil & Gas Drilling Corp. 1 Cramer Reynolds, 31-18-T&P Sur., 5 miles northwest Merkel. IP 187½ BOPD, 20/64-in. choke, 50°, GOR 1171:1, TP 750 psi., Strawn sand 4,687-93, 4,721-29 ft. TD 4,775 ft., elev. 1,824 ft.

Nolan County: J. R. McLean and Wes-Tex Drilling Co. 1 U. M. Ussery, 1 mile northwest Nolan, south offset to depleted Palo Pinto production. IP 126 BOPD, 15/64-in. choke, 38°, GOR 480:1, TP 280 psi., Palo Pinto reef 5,638-44 ft., TD 5,632 ft.

WEST TEXAS

Borden County: Anderson-Prichard Oil Corp. 1 A. M. Clayton (originally Midwest Oil 1 Clayton), 16-31-T6N-T&P, 12 miles northwest Gail. IPP 136 BOPD, 39°, GOR 132:1, Ellenburger 9,048-64 ft. TD 9,117 ft., elev. 2,635 ft.

Crane County: Gulf Oil Corp. 422 W. N. Waddell, 27-B25-PSL Sur., 12 miles northwest Crane. IP 470 BOPD, 24/64-in. choke, 43°, GOR 852:1, TP 380 psi., Pennsylvanian 7,556-7,636 ft.; IP 86 BOPD, 24/64-in. choke, 42°, GOR 468:1, TP 80 psi., Devonian 8,674-9,080 ft.; TD 9,505 ft., ground elev. 2,671 ft. Pennsylvanian discovery in University Waddell-Devonian field.

Crockett County: J. H. Buchanan 1 H. B. Cox estate, 36-GG-HE&WT Sur., 7 miles northeast Sheffield. IP 52 BOPD, ¼-in. choke, 34°, GOR 400:1, TP 50 psi., pay 1,752-68 ft. TD 2,060 ft.

Ector County: Pan American Petroleum Corp. 1 Davis Fasken "AM," 13-42-T1N-G&MMB&A Sur., 16 miles north Odessa. IPP 123 BOPD, 31.9°, GOR 142:1, Grayburg 4,777-87 ft. TD 13,182 ft., PB 4,845 ft. Originally completed as Wolfcamp discovery.

Kent County: Drilling & Exploration Co. 1 P. L. Fuller, 707-97-H&TC Sur., 14 miles southwest Clairemont. IP 364 BOPD, 16/64-in. choke, 40°, GOR 664:1, TP 400 psi., Cayon 6,838-48 ft. TD 6,912 ft., elev. 2,226 ft.

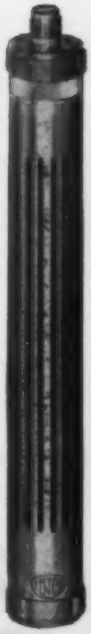
Pecos County: Curtis R. Inman 1 J. L. Nutt, Sec. 5, Blk. 180½, 20 miles southeast Bakersfield, 6 miles northeast Puckett gas field. IP 541 BOPD, 20/64-in. choke, 26.6°, GOR 225:1, TP 80 psi., Grayburg 2,404-07 ft. TD 2,407 ft., elev. 2,951 ft.

Runnels County: Karl Hoblitzelle 1 Vancil, 26-A-895-H&GN Sur., 3 miles south Norton. IP, open flow, 5,800 M.c.f. gas, pay 4,654-70 ft. TD 4,830 ft. Originally completed dry at 4,620 ft.

I *know*.. I use Totco

You'll see men who *know* choose the *Totco Recorder* time after time. In oil fields all over the world Totco has earned a reputation for accurate, reliable readings. Be sure *you* know... use Totco.

TOTCO *Recorder*



Technical Oil Tool Corporation

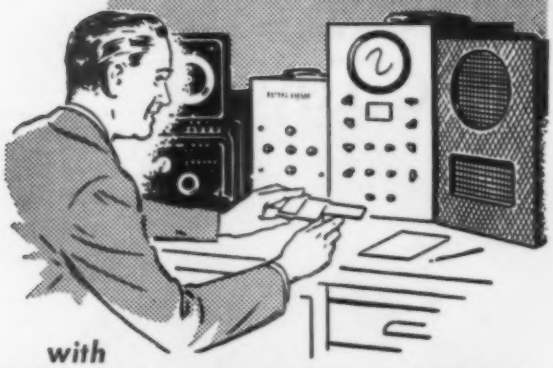
1057 North La Brea Avenue

Los Angeles 38, California

EXCLUSIVE DISTRIBUTORS: *California*—The Republic Supply Co. of California; *Domestic*—The Continental-Emsco Company, a division of Youngstown Sheet & Tube Company; *Canada*—Oil Well Supply Division, United States Steel Corporation; *Export*—Lucey Export Corp., New York City

STOP

EXHAUST NOISE and PIPING VIBRATION



with

BURGESS-MANNING SNUBBERS

Burgess-Manning engineers have spent years of scientific research into the cause and nature of exhaust noise and pipe line vibration. Out of this research came the Burgess-Manning Snubbing Principle.

Throughout the world, Burgess-Manning Snubbers, utilizing this unique principle, are eliminating the deafening, efficiency-reducing roar of engine exhaust and the destructive effects of pipe system vibration and pulsation where compressible gases are pumped.

Engineered by specialists for the specific applications, Burgess-Manning Snubbers pay for themselves in increased efficiency of equipment and personnel, lowered maintenance costs, improved labor and neighborhood relations.

This engineering service, with years of experience in the elimination of noise and vibration, is available for consultation on your problem without obligation.

Write for copies of case histories of typical installations.

Present your problems for Analysis and Recommendations

BURGESS-MANNING COMPANY

Sound Engineering

9217 Sovereign Row, Dallas 35, Texas
Libertyville, Illinois

SEALTIGHT® PIPE SHIELD

. . . The practical answer to PERMANENT PROTECTION against all ROCK DAMAGE!

Effective "holiday-free" pipe protection

Sealtight Pipe Shield provides an easily workable protective shield for pipes in every type of terrain or installation. It is the one completely effective and economical answer to "holiday-free" pipe shielding . . . eliminates the expense of dirt padding. Penetration tests show that even large rocks fail to rupture this material. Ideal for protecting pipe sections pulled across swamps . . . replaces ineffective, costly wooden slats or snow fence materials in shielding coated pipes at river crossings and under river clamps. Sealtight Pipe Shield is impervious to stress and strain of soil movements—unaffected by soil chemicals and moisture. Records of on the job tests prove Sealtight Pipe Shield far more effective and less costly than ditch padding installations.

EASILY APPLIED

Sealtight Pipe Shield is quickly and easily installed by untrained crews. The necessary straps, tools and seals are available and can be shipped as a complete package when desired.

WRITE TODAY FOR FREE TECHNICAL CATALOG.

MANUFACTURED BY

W.R. MEADOWS, inc.

17 KIMBALL STREET • ELGIN, ILLINOIS

Sense of Humor Is an Asset

. . . for Kirby Crenshaw, president of Cities Service Gas. Varied experience also qualifies him for top position.

AN OFFICIAL of Cities Service Gas Co. answers his phone and recognizes the voice of the president.

"This is Kirby. Are you busy?"

"No sir."

"Well why aren't you? What are we paying you for?"

"Aw, I have to be ready for interruptions from Tar Heels like you."

They both laugh.

Good humor and camaraderie are among the reasons why Kirby E. Crenshaw rose from compressor oiler to president of the company.

Another reason is his astute analytical ability—a faculty for getting to the heart of a problem, stripping away the nonessentials, and coming up with a simple and logical solution.

The combination makes a nearly ideal boss, in the opinion of employes.

"People just like to work for Kirby," said one veteran employe. "He can get more work out of people without driving them than anybody I ever knew."

What makes him tick? How does an executive get that way? Can he read a book, or does he have to be born with it?

The veteran looked out of the window thoughtfully for a long time.

"In Kirby's case I think he was born with it," he replied. "People just seem to like him. I guess that's because he likes people. Then, too, he's been in this business all his life and he understands the jobs and the problems of everybody in the company. He takes an interest in what everybody's doing but doesn't try to dictate the details. He outlines an assignment and then delegates responsibility."

KIRBY E. CRENSHAW
. . . an understanding boss

His start . . . Crenshaw switched from railroading to the gas business because of the higher pay—$125 per month as against the $92 that Seaboard Air Line offered him. That was in 1930 during the depression, and he had just received a civil-engineering degree from North Carolina State College.

He had worked his way through college as a section hand, draftsman, and surveyor for the Seaboard, and he thought that a C. E. degree should make him worth more than $92 a month. So he grabbed an opportunity as engineer trainee with Cities Service at Bartlesville, Okla. But the depression got worse, the training program was abandoned, and Crenshaw became a compressor-station oiler at Pampa, Tex.—at $92 a month.

Then he was promoted to meter repair man, meter inspector, production engineer, and finally assistant superintendent at Pampa.

It was as a meter inspector that Crenshaw developed what came to be his greatest interest in the gas business—measurement.

In a voice that still carries some of the soft drawl of Georgia where he was born in 1908, he explains:

"In those days the gas industry wasn't paying much attention to measuring the thing it was buying and selling. I can't claim credit for any technical developments in metering or any research projects or training programs. But I always have been very interested in gas measurement, and I guess I have helped spur the industry into making progress in improved methods."

Crenshaw's opportunity came in 1938 when the tax department in Bartlesville needed an engineer, and he was it. He did such a good job of straightening out the mess of valuation procedures that in 1940 he was moved to New York and assigned to Gas Advisers, Inc., a Cities Service subsidiary.

For the next 16 years he handled a variety of advisory, management, and trouble-shooting assignments for the gas operations of the Cities Service group, thus acquiring an over-all view of the industry's problems.

The present . . . He has been president of Cities Service Gas Co. only since August. But for 2 years previously he had been virtually running the company in Oklahoma City as executive vice president while the president, Harry D. Hancock, remained in New York.

Crenshaw was asked, "What do you feel you have accomplished here?"

"Organization," was his quick reply.

"First, I never liked the idea of having the headquarters in Oklahoma City and the operations in Wichita. It took a lot of persuading, but we now have all operations under one roof here in Oklahoma City where we can function more efficiently as a team, and everybody seems to be happy about it now.

"Second, we have a lot of old timers nearing the retirement age and we needed to encourage the younger men and prepare them for top positions. So we have just completed a rather sweeping realignment of divisions, titles, and lines of responsibility.

"A company depends on its people, and one of management's chief responsibilities is to develop its people and make them like their work and understand the importance of what they're doing. That's been my biggest job here," he added.

His views . . . Crenshaw gave outspoken answers when questions were posed:

What's the biggest problem ahead?

"Getting a high enough price for our gas to cover our rising costs and particularly to give a payout to the expansion we should make in our facilities to keep up with the growing demand. That's hard enough to do in a regulated industry at any time, but unless the Memphis decision is reversed, it looks close to impossible."

And what's the biggest problem of the gas industry as a whole?

"Clearing away the regulatory mess imposed by the Phillips decision. If we can't get some corrective legislation like the Harris-O'Hara bill, the industry will stagnate, and one of these days consumers will wake up to the fact that they can't get the additional gas they need."

How can opposition to such a bill be overcome?

"By education. The gas industry has been backward in its public relations. But I believe we are now taking a new approach to public opinion and are trying to understand the people we deal with and get them to understand us. When we do that, we'll begin to get somewhere."

Talking shop at the head table of the thirteenth annual Pipe Liners Club banquet in Chicago last week were, left to right, C. R. Younts, Plantation; J. L. Burke, Service; R. G. McIntyre, Four Corners; J. H. Wood, Jr., Atlantic Pipe Line; J. L. Latimer, Magnolia; W. C. Kinsolving, Sun; C. R. Musgrave, Phillips; and Marston Linehan, Sunray Mid-Continent. Linehan, Sunray vice president, was elected 1959 president of the Pipe Liners. To the right of Linehan are Ralph K. Paine, Standard of California's pipeline manager and immediate past president

Charles L. Cochran, formerly superintendent of Texas Illinois Natural Gas Pipeline Co.'s Conroe, Tex., station, has joined Coastal Transmission Corp. as chief inspector at the Baton Rouge, La., station.

Elijah P. Cunningham, group leader in the research department of Monsanto Chemical Co.'s organic chemicals division, St. Louis, has been named division manager of technical sales service on petroleum chemicals. Cunningham has been in charge of the company's research engine lab in St. Louis since 1948. In the new post he will be advisor on technical aspects of product applications, liaison between the sales and research departments, and will coordinate product technical requirements.

William E. Preston, central division manager for Northern Illinois Gas Co., has been appointed director of planning, a new position. He will be succeeded in the central division by **Daniel E. Garrity,** western division manager. **Roy W. Holdiman,** Fox Valley area district manager, succeeds Garrity. **Robert J. Eby,** central division commercial manager, has been appointed assistant central division manager, also a new position. In other changes, **David T. Strieff** succeeds Eby; **George C. Habenicht** succeeds Holdiman in the Fox Valley area; and **James F. Ahern** succeeds Habenicht as district operating superintendent for the Ottawa area. **Edward B. Boyd** has been named Rock River district manager succeeding Strieff.

B. G. Symon, manager of Shell Oil Co.'s industrial products department, has been named general sales manager for International Lubricant Corp., a Shell subsidiary.

Charles W. Carey, Union Oil Co., has been elected president of the Pacific section of Society of Economic Paleontologists and Mineralogists. **Alvin A. Almgren,** Superior Oil Co., was elected secretary-treasurer.

Walter Shannon, vice president and manager of operations for Gulf Refining Co., has been appointed director of pipeline engineering for Gulf Oil Corp. He will headquarter in Pittsburgh. Shannon will advise Gulf and its subsidiaries on pipeline design, facilities, construction, operation and maintenance. He will design pipeline systems and will evaluate operational performance. Shannon has been with Gulf 38 years. He was general superintendent of the pipeline department in Houston before being named vice president and manager of operations for Gulf Refining last year.

Dr. Charles E. Weaver, Shell Development Co., received the Mineralogical Society of America Award at a recent meeting of the National Geological Society in St. Louis. The award recognizes an outstanding contribution in original research made by a young scientist.

Charles A. Wight, chairman of the executive committee of Freeport Sulphur Co., has been named president. He succeeds **Langbourne M. Williams,** who will continue as chairman and chief executive officer. Wight will be succeeded as executive committee head by **Pearson E. Neaman,** senior vice president and general counsel. Neaman will continue as general counsel.

J. E. Wootton has been named division superintendent for drilling and production in Texas Pacific Coal & Oil Co.'s West Texas and New Mexico division, Midland, Tex. He has been assistant division superintendent in Midland for the past year. Wootton succeeds **George G. Pollard,** who has resigned. Wootton was superintendent in Lubbock, Tex., for Pan American Petroleum Corp. before becoming a drilling contractor in 1950. He joined Texas Pacific 3 years ago.

James S. Lauderdale, partner in Lauderdale & Straughan Drilling Co., Abilene, Tex., was reelected president of the West Central Texas Oil and Gas Association at the association's silver-anniversary annual meeting in Abilene recently. Also reelected were vice presidents **Ray Dilger,** president of Woodson Oil Co., Fort Worth, and **William G. Arnot, Jr.,** Breckenridge independent. New vice presidents are **Sam Robertson,** Abilene independent, and **Eugene Adair,** executive vice president of Texas Pacific Coal & Oil Co., Fort Worth. They replace **W. W. Wilson, Jr.,** and **James E. Russell,** both of Abilene.

of the club; Earl W. Unruh, president of Sinclair Pipe Line, who was elected to the membership committee; L. H. True, Magnolia; J. L. Irvin, Gulf; G. H. Supple, General Petroleum; R. H. Lynch, Atlantic Pipe Line; and A. E. Pecore, Humble. Other new officers of the club, not pictured, include Harry Mooreland, president of Great Lakes Pipe Line, who will be vice president, and John W. Emison, president of Texas Pipe Line, who was named to the board of governors. The banquet was held in the Grand Ballroom of the Palmer House Hotel.

John R. Suman, retired vice president of Standard Oil Co. (N. J.), has received the Howard Coonley Medal of American Standards Association in recognition for his work in development of standards for oil-field equipment and practices. The award will be presented November 19 during the Annual Conference on Standards in New York. Suman is now a petroleum consultant in Houston.

Socony Mobil Oil Co.'s research department has been reorganized into four divisions. **Guy R. M. del Giudice** will head the applied research and development division; **Theodore G. Roehner** will head technical service; and **Edward S. Nicholls** is head of the administration section. **Dr. Dayton H. Clewell,** general manager of the research department, will head the central research division at present. Also, **John W. Payne** has been named senior scientist, a new position.

J. W. Montgomery, development engineer for Shell Oil Co. in Roswell, N. M., division, has been transferred to Houston. **W. F. Quevreaux,** mechanical engineer in Roswell, has been transferred to the northern division, Midland area, as mechanical engineer. **R. W. Jasper,** former northern division mechanical engineer, has been named development engineer in the Midland area. **G. W. Olson,** Denver development engineer, moves to Roswell as mechanical engineer. **J. A. Burgbacher,** chemical engineer in the Houston area, has been transferred to the northern division as mechanical engineer.

L. A. MacPherson, petrophysical engineer in Shell Oil Co.'s Tulsa office, has been promoted to division petrophysical engineer in Oklahoma City. **H. J. Conrad** and **C. W. Mangus,** junior exploitation engineers for Shell in New Orleans, have been transferred to Tulsa. **G. A. McQuate** and **R. S. Stanley,** junior geologists in Chouteau, Mont., have been moved to Oklahoma City.

W. C. (Dub) Tillett, manager of exploration contracts at Tennessee Gas Transmission Co.'s Houston headquarters, has been named manager of the southwestern exploration division at Midland, Tex. **R. C. Honea,** formerly division exploration manager at Midland, has moved to Houston as staff geologist. **E. T. Creegan,** district landman at Casper, Wyo., has been named district exploration manager at Wichita Falls, Tex. Creegan succeeds **Donald L. Hellar,** who recently resigned.

E. P. Zehner, operating superintendent at Sinclair Refining Co.'s Houston refinery, has been promoted to assistant manager of the refinery. He succeeds **R. B. Thacker, Jr.,** who has been transferred to Marcus Hook, Pa. **Clanton Rylander, Jr.,** will succeed Zehner as operating superintendent at Houston. Also, **Monte G. Waller** has been promoted to head of the light-oil division at Houston. Zehner joined Sinclair's East Chicago refinery in 1925. He moved to the Houston plant 3 years later. He had been operating superintendent there since 1954.

William L. Bammel, computer with Atlantic Refining Co., has been transferred to Dallas from Crowley, La.

Andre Masson, district geologist for Skelly Oil Co. in Bismarck, N. D., has been elected president of the North Dakota Geological Society. **Don Sarber,** Sinclair Oil & Gas Co., Bismarck, is outgoing president. Other new officers are **Norman C. Knapp,** Mobil Producing Co., vice president; **Jack W. Pierce,** Pure Oil Co., secretary; and **Maurice H. Smith,** Northwest Geological Service, treasurer.

ISBERG

John T. (Jack) Isberg, Superior Oil Co., has been elected 1959 president of the Pacific section of American Association of Petroleum Geologists. Other new officers include **Irving T. Schwade,** Richfield Oil Corp., vice president; **Paul H. Dudley, Jr.,** Humble Oil & Refining Co., secretary; and **Harold L. Fothergill,** Union Oil Co., treasurer.

Robert B. Moran, Moran Investment Co., has been elected president of the Pacific section of Society of Exploration Geophysicists. Other officers are **John P. Gates,** Western Gulf Oil Co., southern area vice president; **W. P. Wilson,** Western Gulf, northern area vice president; **Nolen A. Webb,** Richfield Oil Corp., secretary-treasurer; and **T. L. Slaven,** Western Geophysical Co., editor.

▶ ▶ ▶ Personals

Dan J. Hartnett, division sales manager for Ashland Oil & Refining Co. in East Alton, Ill., has joined Lion Oil Co. division of Monsanto Chemical Co. as assistant manager of gasoline and fuel oil sales.

Gene Van Dyke, Wichita Falls, Tex., independent operator and geologist, and **Georg O. Majlaender, Jr.,** formerly district geologist in San Antonio Tex., for Arkansas Fuel Oil Corp., have formed a partnership, Van Dyke & Majlaender, in Houston.

Shell Oil Co.'s Jackson, Miss., district office has been assigned larger territory and reorganized as the Jackson production division. **F. A. Schurtz,** Jackson district production superintendent, has been promoted to manager of the Jackson division. **O. D. Hutto** has been named division production superintendent. **J. H. Williams** becomes division exploitation engineer with **F. A. MacDougall** as division mechanical engineer. **C. E. Majors** becomes division office supervisor.

Richard Harding, geologist, has been transferred to New Orleans from Bismarck, N. D., by The Texas Co.

CORLEW

R. P. Corlew has been appointed manager of refineries for Richfield Oil Corp. and manager of the company's Watson refinery at Wilmington, Calif. He was formerly assistant manager there. Corlew succeeds **C. R. McKay,** who has retired after 35 years in the industry. McKay became Richfield's manager of refineries in 1937. **E. H. Reynolds,** superintendent of operations in the refining department, has been named assistant manager of refineries, operations. **Frank J. Fontana,** chief engineer, has been appointed assistant manager of refineries, maintenance and construction. A graduate of Colorado School of Mines, Corlew has been with Richfield since 1938. He had been process engineer and superintendent of light oil operations before becoming assistant manager at Wilmington.

L. R. Woolsey, director of direct sales for British American Oil Co., Ltd., has been promoted to general manager of marketing. He succeeds **A. E. Osborough,** who has retired.

George Henry Roraback, formerly engineer with The Texas Co. in Pampa, Tex., has joined Texas Eastern Transmission Corp. as reservoir engineer in Houston.

George H. Fentress, formerly Rocky Mountain area manager of exploration and production for Baumgartner Oil Co., has joined Exeter Drilling Co., Denver, as manager of exploration operations in the Denver basin and Rocky Mountain area.

Ronald Geer, Midland, Tex., area development engineer, and **D. deVries,** mechanical engineer in the northern division, Midland area, have been transferred to Shell Development Co. in Houston. **F. H. Taylor,** special assistant to the Midland production manager, has been transferred to New York. Also, **S. G. Stiles,** special assistant to the production manager, has been given an assignment in New York and The Hague.

▶ ▶ ▶ Deaths

Dr. Kenneth Albert Kobe, chemical engineering department faculty member at the University of Texas since 1941, died November 2 in Austin. A graduate of the University of Minnesota, Kobe was named a distinguished Minnesota alumnus in 1955. He held several U. S. and Canadian patents and was the author of three books and many scientific papers.

John E. Millar, Jr., 62, seismic coordinator for Sinclair Oil & Gas Co. in Ardmore, Okla., died November 6 in Taos, N. M., where he was vacationing. After graduation from the University of Kansas in 1923, Millar joined the old Empire Gas & Fuel Co., in Bartlesville, Okla. Millar had been with Sinclair since 1926. He was at one time an engineer in Venezuela, Houston production engineer, and senior geologist in Oklahoma City and Ardmore for the company.

William T. Dick, 75, Pasadena, Calif., owner of Dick & Dore Oil Co., died October 31 in Pasadena.

Arthur E. Barrus, 76, retired secretary-treasurer of Sinclair Oil & Gas Co., died November 7 in Tulsa. He had been ill for several months. Barrus had been with Sinclair and its affiliates 35 years before retiring in 1948.

Benton E. Warren, 59, manager of Sun Oil Co.'s Latin American production division, died November 10 in Bryn Mawr, Pa. Warren suffered a heart attack at a Sun executives meeting in Philadelphia. He was vice president and general manager of several Sun subsidiaries operating in Latin America including Venezuelan Sun Oil Co., Colombian Sun Oil Co., and Guatemalan Sun Oil Co. Warren joined Sun in Venezuela in 1920. He became manager of the southwestern production division natural gasoline department in Dallas in 1946. When Sun set up a foreign operations department in 1946, Warren became manager of the Latin American division in Caracas.

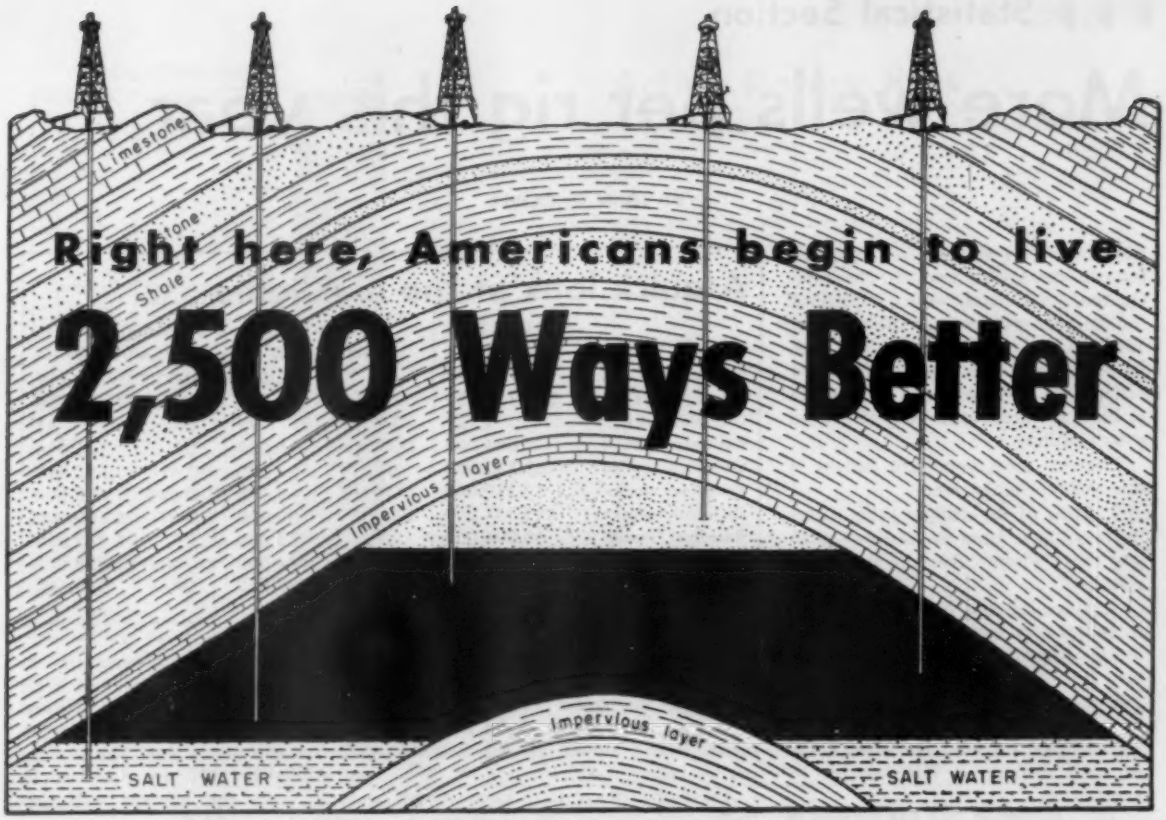
David R. Travis, 89, retired independent oil man, died November 9 in Tucson, Ariz. Travis was president of Gled Oil Co., which developed Oklahoma's South Mannford field in the 1920's. He retired in 1948 and moved to Denver from Tulsa. In recent years his home was in Tucson.

Dr. Louis Veillon, 84, first employe of Monsanto Chemical Co. when it was founded in 1901, died November 11 at his home in Switzerland. A graduate of the Federal Polytechnic Institute at Zurich, Switzerland, Veillon came to the U. S. in 1901 to help found Monsanto. He planned the company's first operating plant and later its first saccharin plant. He returned to Switzerland after retiring from Monsanto in 1927.

John Henry (Happy Jack) Wroten, 64, Sour Lake, Tex., pioneer pipeliner, died November 8 in Beaumont, Tex. Wroten was active in the Cushing and Burkburnett field booms. In the days of screw-pipe operations, he was noted for being able to take the joint "one more round."

Lloyd Pickrell, head of Pickrell Drilling Co., Wichita, died recently at his home in Wichita.

Angus McLeod, 70, independent operator and geologist, died November 9 in Dallas. McLeod was with Canadian Geological Survey, Roxana Oil Co., and Shell Oil Co. at one time. He was 1955-56 president of the Clan McLeod in North America.



Right here, Americans begin to live 2,500 Ways Better

Without petroleum, nearly 3,000 products that enrich our daily lives would not be possible, or would be so costly that few of us could afford them.

Petroleum has given us new and amazing fabrics . . . a safe refrigerant so we can enjoy fresh-frozen foods . . . swift transportation by automobiles, diesel trains and airplanes. Agriculture, industry, even medicine—all owe a vote of thanks to petroleum.

At Skelly, we are proud to be a part of the glory that is the petroleum industry. Proud to be able to look upon the rich, full life we Americans lead, knowing that we have helped make this nation a better place to live.

SKELLY OIL COMPANY SALUTES THE ACCOMPLISHMENTS OF THE RECENT A.P.I. CONVENTION IN CHICAGO

SKELLY OIL COMPANY

Executive Headquarters: Tulsa, Oklahoma

Division Offices: Aberdeen • Chicago • Dallas • Denver • Des Moines • Kansas City • Omaha • St. Louis • St. Paul • Tulsa • Wichita

More wells per rig this year

BY JOHN C. CASPER

ROTARY-RIG activity for 1958 has been at the lowest level in 10 years. On the other hand, well completions for the year will be near the total for 1953. Also, rotary completions will be down very little from 1953. These differences have been due to shifts in drilling by areas and to a trend in rotary drilling.

The two most important factors in this year's change are:

1. Most of the drilling gains so far this year have been in relatively shallow areas where cable-tool drilling is possible.

2. Since the end of World War II, there has been a definite trend toward more completions for each active rotary rig.

One of the larger percentage gains in drilling so far this year has been reported for Indiana, and about 74% of total drilling in this state is by cable tools.

The completion rate has jumped in Central and eastern Kentucky where almost all of the drilling is cable. Over 600 wells have been drilled in Green County so far this year, and all were cable-tool completions. Also, cable-tool completions in Breathitt County have been averaging better than 10 wells per week. These wells have more than accounted for the gain in Kentucky so far this year.

Drilling in New York shows a gain over last year, and almost all wells in this state are drilled with cable tools. The other side of the picture shows that the largest percentage drop in drilling this year has been in California where almost all the hole is cut by rotary rigs.

These changes in 1958 have tended to produce smaller percentage reductions in completions than in operating rotary rigs. The second of the above factors also tends to give the same results. The chart and table show a definite upward trend in number of completions for the average rotary rig.

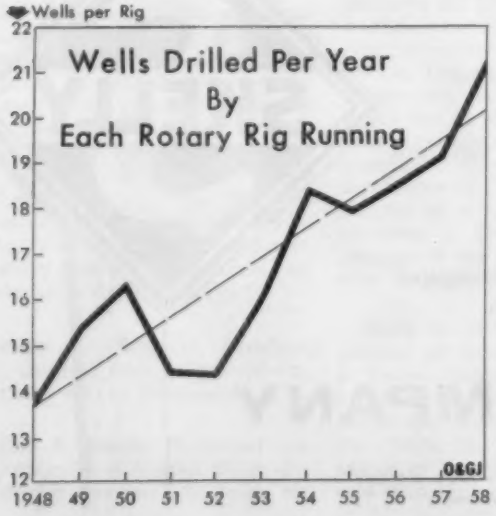
Note the dip in the curve for 1951 and 1952. This was due to big gains in operating rigs with only small increases in rotary completions. The steep climb in number of rotary rigs in 1951 and the early part of 1952 was due to the rapid expansion in drilling in the Spraberry area of West Texas. The period 1951-52 showed the sharpest gain in average well depth since the end of the war. The average well drilled in 1950 was 3,680 ft. In just 2 years the average well had deepened to 4,085 ft.

Despite year-to-year changes in the number of wells drilled per rig, the general trend has shown a steady climb. Rotary completions averaged 13.7 wells per rig in 1948 and are expected to top 21.0 this year.

However, this trend will be reversed when more and more drilling shifts to the deeper basins and offshore areas. Louisiana offshore drilling is down 38% but will move back up when crude markets improve.

A quick look at the highlights . . .

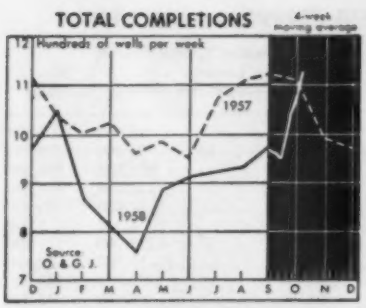
	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,996,397	UP	80,567	UP	192,419
Crude stocks	255,720,000	UP	727,000	DOWN	27,391,000
Completions	1,127	UP	92	UP	61
Refinery runs	7,686,000	DOWN	66,000	UP	146,000
Gasoline stocks	169,210,000	UP	734,000	DOWN	11,595,000
Kerosine stocks	32,369,000	DOWN	5,000	DOWN	1,808,000
Distillate stocks	165,354,000	DOWN	1,060,000	DOWN	8,609,000
Residual stocks	68,095,000	UP	515,000	UP	8,757,000
Four-product stocks	435,028,000	UP	184,000	DOWN	13,255,000
Total imports	1,609,100	DOWN	292,200	UP	358,600

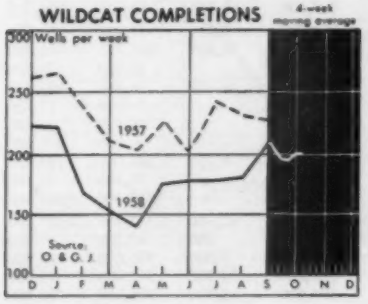


WELL COMPLETIONS PER YEAR—BY AVERAGE ACTIVE ROTARY RIG

	Total completions*	Rotary completions*	Active rotary rigs†	Completions per rig
1948	39,778	29,650	2,165	13.70
1949	39,038	31,000	2,017	15.37
1950	43,279	35,300	2,154	16.39
1951	44,516	36,820	2,543	14.48
1952	45,821	37,980	2,641	14.38
1953	49,279	42,040	2,613	16.09
1954	53,930	46,210	2,509	18.42
1955	56,682	48,430	2,687	18.02
1956	58,160	48,680	2,619	18.59
1957	53,838	46,550	2,425	19.20
1958	‡49,000	‡40,500	‡1,905	21.26

*The Oil and Gas Journal. †Hughes Tool Co. ‡Estimated by The Oil and Gas Journal.





Active Rotary Rigs*

	11-10-58	11-3-58	11-11-57
Alabama	14	13	7
Arkansas	25	24	24
Arizona	2	2	1
California	83	83	84
Colorado	26	29	52
Florida	1	1	1
Georgia	....	....	....
Idaho	....	....	....
Illinois	57	54	65
Indiana	12	10	9
Iowa	3	3	2
Kansas	156	153	160
Kentucky	6	10	10
Louisiana	312	315	402
North	37	37	57
South	238	244	260
Offshore	37	34	85
Maryland	1	1	1
Michigan	9	10	11
Missouri	1	1	....
Montana	26	28	40
Mississippi	57	53	46
Nebraska	28	25	24
Nevada	....	....	....
New Mexico	98	91	153
New York	2	2	1
North Dakota	31	31	41
Ohio	5	4	1
Oklahoma	239	237	249
Oregon	....	....	....
Pennsylvania	8	8	12
South Dakota	....	1	2
Texas	722	717	874
South-Gulf	124	131	179
Offshore	....	....	4
North-East	155	163	(†)
West Central	275	249	(†)
West	168	174	(†)
Tennessee	....	....	....
Utah	41	39	54
Washington	1	1	1
West Virginia	4	6	4
Wyoming	74	63	80
Virginia	....	....	....
Total U. S.	2,044	2,015	2,411
Western Canada	156	144	166
Eastern Canada	3	3	2
Grand Total	2,203	2,162	2,579

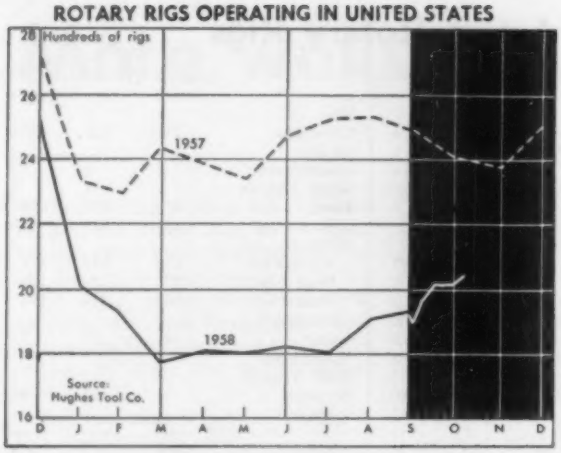
*Hughes Tool Co. †Comparisons not available due to change in method of reporting.

WEEKLY WELL COMPLETIONS . . . WEEK ENDED NOVEMBER 8, 1958

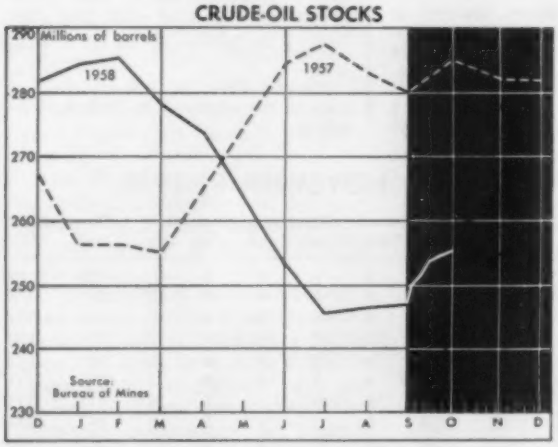
	Total wells							Cumulative		Total wildcats					Cumulative	
	Total	Crude	Cond.	Gas	Dry	Service	Footage	1958	1957	Total	Crude	Cond.	Gas	Dry	1958	1957
Alabama	4	2	0	0	2	0	32,982	68	69	2	0	0	0	2	26	23
Arkansas	16	6	0	1	9	0	57,261	687	960	2	0	0	0	2	140	175
California	18	9	0	2	7	0	103,021	1,294	1,902	3	0	0	0	3	316	451
Colorado	22	3	0	5	14	0	107,014	732	736	12	0	0	4	8	426	480
Illinois	52	27	0	1	24	0	129,399	1,941	2,314	10	0	0	0	10	389	545
Indiana	19	7	0	0	12	0	33,106	721	587	6	1	0	0	5	262	115
Kansas	184	84	0	14	83	3	665,474	3,411	3,620	38	10	0	0	28	711	715
Kentucky	68	54	0	4	10	0	57,064	1,519	1,300	1	1	0	0	0	147	262
Louisiana	66	24	5	8	29	0	502,178	2,942	3,334	12	0	1	0	11	441	590
North	26	7	0	7	12	0	99,824	1,132	1,232	5	0	0	0	5	191	167
South	36	15	4	1	16	0	356,799	1,445	1,512	7	0	1	0	6	226	346
Offshore	4	2	1	0	1	0	45,555	365	590	0	0	0	0	0	24	77
Michigan	9	5	0	0	4	0	27,875	376	385	7	3	0	0	4	129	135
Mississippi	11	4	1	0	6	0	83,804	339	335	4	0	0	0	4	152	169
Montana	3	1	0	0	2	0	24,593	279	370	2	0	0	0	2	112	142
Nebraska	23	7	0	0	16	0	142,023	624	776	10	1	0	0	9	292	423
New Mexico	36	16	1	9	10	0	172,648	1,664	1,851	3	0	0	0	3	229	238
West	19	6	1	8	4	0	80,931	815	789	1	0	0	0	1	91	93
East	17	10	0	1	6	0	91,717	849	1,062	2	0	0	0	2	138	145
New York	6	3	0	0	0	3	7,814	463	399	0	0	0	0	0	41	7
North Dakota	7	5	0	0	2	0	44,773	400	251	1	0	0	0	1	125	114
Ohio	23	9	0	8	6	0	55,974	881	981	1	1	0	0	0	14	16
Oklahoma	125	66	0	4	50	5	414,899	5,408	5,473	14	1	0	0	13	731	653
Pennsylvania	54	14	0	27	7	6	177,753	528	571	2	0	0	1	1	19	41
Texas	359	201	13	11	122	12	1,474,658	15,392	18,669	57	3	1	1	52	3,121	4,426
District 1	17	5	1	1	9	1	50,401	852	1,075	10	1	0	1	8	337	369
District 2	8	3	0	0	5	0	41,700	636	667	2	1	0	0	1	167	232
District 3	20	5	0	1	14	0	138,426	1,095	1,448	7	0	0	0	7	249	405
District 4	19	3	2	0	11	3	95,942	999	1,195	4	0	1	0	3	297	384
East	20	7	4	0	9	0	128,724	1,050	1,168	5	0	0	0	5	289	331
District 7-B	48	19	1	2	25	1	114,308	2,115	2,553	9	0	0	0	9	573	864
West	120	99	2	1	16	2	579,906	4,397	5,291	9	1	0	0	8	610	752
District 9	76	42	0	2	28	4	220,724	3,116	4,046	9	0	0	0	9	491	991
District 10	31	18	3	4	5	1	124,527	1,132	1,226	2	0	0	0	2	108	98
Utah	7	0	0	3	4	0	25,500	337	208	1	0	0	0	1	76	105
West Virginia	0	0	0	0	0	0	0	630	603	0	0	0	0	0	15	30
Wyoming	15	4	0	2	9	0	73,723	642	740	7	0	0	0	7	210	250
Miscellaneous	0	0	0	0	0	0	0	82	120	0	0	0	0	0	72	102
Total U. S.	1,127	551	20	99	428	29	4,413,536	41,360	46,554	195	21	2	6	166	8,196	10,207
Total prev. wk.	1,035	504	19	64	426	22	4,071,456	.....	.....	205	13	1	6	185	.....	.....
Cum. 1958	41,360	20,360	954	3,107	15,849	1,090	168,442,237	.....	.....	8,196	793	136	224	7,043	.....	.....
West'n Canada	48	33	0	2	13	0	238,099	2,122	2,616	15	2	0	1	12	567	740

PRODUCTION

ROTARY RIGS OPERATING IN UNITED STATES



CRUDE-OIL STOCKS



CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	11-1-58	10-25-58	11-2-57
Pennsylvanian	2,741	2,724	3,098
Other Appalachian	1,941	1,529	1,747
Illinois, Indiana, Michigan	9,460	9,540	11,344
Nebraska and North Dakota	2,576	2,783	2,808
Kansas	10,448	19,414	10,379
Oklahoma	17,484	17,044	20,467
Arkansas	2,035	1,853	2,754
Louisiana	17,114	16,425	20,092
North	2,898	2,842	3,094
South	14,216	13,583	16,998
Mississippi, Alabama, Florida	2,569	2,727	2,766
New Mexico	7,574	7,736	9,441
Texas	110,162	‡110,628	126,208
East Texas	8,304	8,176	9,883
West Texas	53,916	54,130	56,721
Texas Gulf	19,852	19,819	24,807
Other Texas	28,090	‡28,503	34,797
Wyoming	13,401	‡13,528	13,873
Other Rocky Mountain	9,647	9,452	7,025
California	33,395	33,298	32,010
Foreign	†15,173	15,312	19,099
Total	**255,720**	254,993	283,111

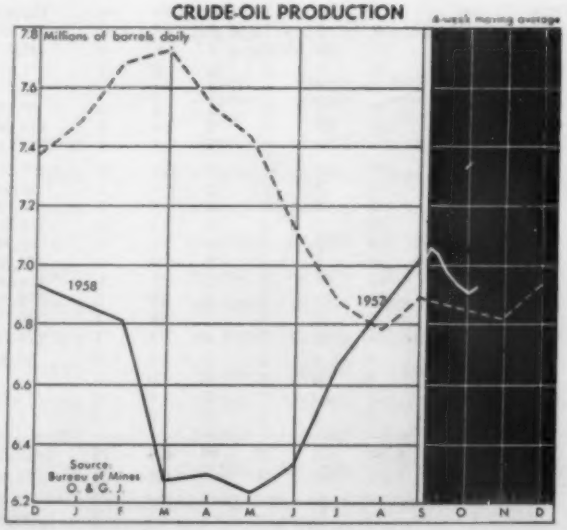
*Bureau of Mines. †Includes 5,520,000 bbl. in California. ‡Revised.

DAILY AVERAGE PRODUCTION FOR WEEK

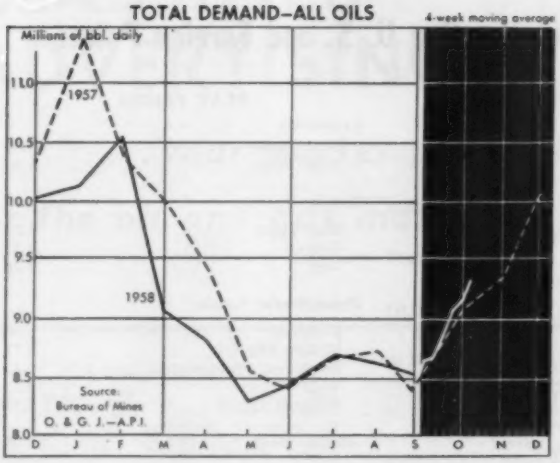
	November 8, 1958 Crude oil	Lease condensate	Total	Nov. 1 total
Alabama	16,300	.....	16,300	16,230
Arkansas	79,650	150	79,800	79,750
California	852,700	.....	852,700	848,200
Colorado	132,600	.....	132,600	132,000
Eastern	44,600	.....	44,600	47,000
Florida	1,222	.....	1,222	1,200
Illinois	223,300	.....	223,300	221,100
Indiana	32,700	.....	32,700	32,300
Kansas	†333,825	.....	†333,825	†343,000
Kentucky	50,100	.....	50,100	45,500
Louisiana	825,500	93,125	918,625	899,575
North	109,500	3,800	113,300	113,175
South	716,000	89,325	805,325	786,400
Michigan	25,300	.....	25,300	25,200
Mississippi	115,750	4,700	120,450	109,500
Montana	76,800	.....	76,800	77,100
Nebraska	58,400	.....	58,400	58,000
Nevada	100	.....	100	100
New Mexico	278,000	6,100	284,100	283,100
North Dakota	32,400	.....	32,400	32,100
Oklahoma	†537,400	.....	†537,400	†544,300
Texas	2,675,000	62,700	2,737,700	2,683,200
Dist. 1	47,000	700	47,700	47,500
Dist. 2	117,000	8,000	125,000	124,300
Dist. 3	361,000	31,000	392,000	373,000
Dist. 4	196,000	7,500	201,500	201,800
Dist. 5	30,000	400	30,400	31,400
Dist. 6	119,000	6,800	125,800	126,800
East Texas field	151,000	.....	151,000	149,000
Dist. 7-B	138,000	75	138,075	144,050
Dist. 7-C	141,000	3,825	144,825	142,050
Dist. 8	1,067,000	2,000	1,069,000	1,024,000
Dist. 9	207,000	1,500	208,500	211,500
Dist. 10	101,000	900	101,900	107,800
Utah	115,000	.....	115,000	108,200
Wyoming	328,700	.....	328,700	329,000
Others	‡175	.....	‡175	‡175
Total U. S.	6,835,522	166,775	**7,002,297**	6,915,830
Change from previous week, up			**86,467**	
Canada	†386,400	.....	†386,400	†446,600
Total U. S. production, January 1-November 8			2,068,112,139 bbl.	
Same period last year (crude plus cond.)			*2,251,854,661 bbl.	

*Includes 43,656,640 bbl. condensate. †Week ended previous Monday. ‡South Dakota and Washington.

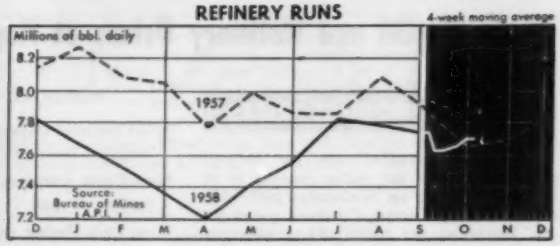
CRUDE-OIL PRODUCTION



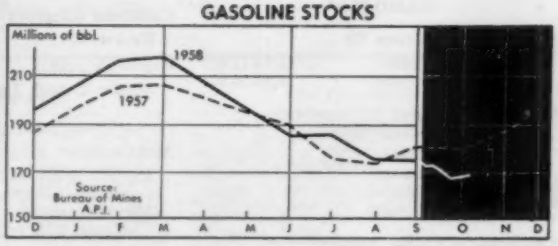
TOTAL DEMAND—ALL OILS



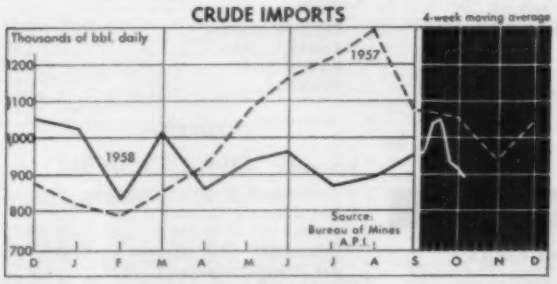
REFINERY RUNS



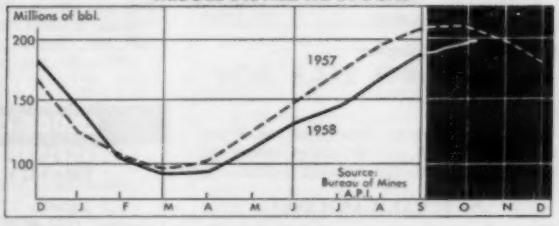
GASOLINE STOCKS



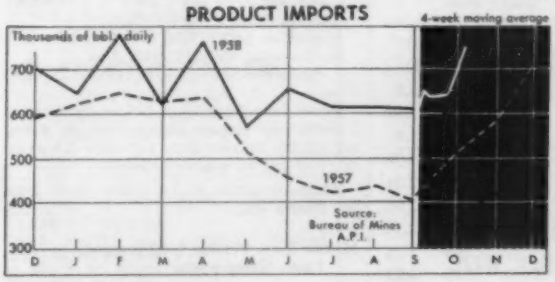
CRUDE IMPORTS



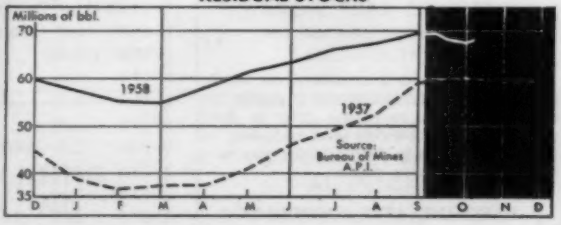
MIDDLE-DISTILLATE STOCKS



PRODUCT IMPORTS



RESIDUAL STOCKS



API REFINERY REPORT—NOVEMBER 7, 1958

(Thousands of barrels)

District†	Daily avg. runs	Daily average production: Gaso.*	Kero.	Dist.	Resid.	Stocks‡: Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, November 1957: Daily avg. runs	Daily average production: Gaso.*	Kero.	Dist.	Resid.
East Coast	1,161	451.3	22.3	359.0	163.6	40,110	12,281	57,324	12,983	1,111	444.7	36.0	296.0	174.7
Appalachian:														
District 1	92	42.3	3.4	19.6	9.4	4,450	647	3,914	296	100	43.7	4.5	21.8	9.3
District 2	103	57.0	5.7	17.4	18.1	2,393	642	1,546	219	110	54.5	3.7	21.6	16.2
Ind., Ill., Ky.	1,324	732.1	66.0	271.4	142.7	29,240	8,148	30,535	5,593	1,441	762.6	73.4	306.5	185.5
Minn., Wis., Dak.	101	49.1	8.9	24.6	7.4	6,588	1,504	8,888	547	90	42.1	4.5	23.1	10.7
Okla., Kans., Mo.	679	383.7	13.6	164.4	27.0	15,637	1,744	13,434	1,187	693	393.1	13.2	170.6	37.2
Inland Texas	291	210.3	4.4	53.6	21.0	6,778	421	2,214	2,135	260	189.6	8.3	37.6	26.1
Tex. Gulf Coast	1,785	1,006.6	114.1	435.9	207.1	22,338	3,448	18,164	8,086	1,737	876.5	123.6	429.0	196.8
L. Gulf Coast	703	365.6	78.7	147.9	40.3	10,629	1,717	7,444	1,444	615	348.6	36.7	158.7	42.5
N. La. and Ark.	99	49.4	6.0	21.7	6.0	4,309	1,045	2,424	118	96	39.2	8.6	18.5	6.4
Rocky Mountain:														
New Mexico	21	11.6	.....	6.4	2.2	446	30	151	49	27	14.6	0.5	5.1	3.6
Other Rky.Mt.	266	121.7	2.2	64.3	32.2	4,204	348	3,070	972	275	133.8	4.2	67.7	36.8
West Coast	1,061	469.9	1.3	178.4	301.4	22,088	394	14,246	34,466	1,138	521.1	6.4	177.4	322.8
Nov. 7, 1958	7,686	3,950.6	326.6	1,764.6	978.4	169,210	32,369	165,354	68,095	7,693	3,864.1	323.6	1,733.6	1,068.6
Oct. 31, 1958	7,752	3,914.3	306.3	1,862.7	1,017.6	168,476	32,374	166,414	67,580	.....	.....	.....	.....	.....
Nov. 8, 1957	7,540	3,746.3	276.3	1,695.7	1,021.6	180,805	34,177	173,963	59,338	.....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines.

Crude-Oil and Refinery Prices at Representative U. S. and Foreign Points

REFINED-PRODUCT PRICES

Following quotations are for refinery products in cents per gallon moving in interstate shipments on Wednesday each week unless otherwise noted. Crude-oil prices are per barrel at the wells unless otherwise listed.

GASOLINE*

Mid-Continent (Group 3):

Regular (89 octane)	11.50-11.625
Premium (99 octane)	14.50-14.625

Gulf Coast (cargoes for coastwise or export movements):

Regular (90 octane)	10.25
Regular (92 octane)	10.50
Premium (97 octane)	11.625
Premium (98 octane)	11.75

California (rack) (Los Angeles):

Regular (88 octane)	12.2-13.7
Premium (94 octane)	13.2-15.5
Premium (98 octane)	14.2-16.5

Caribbean area (cargoes):

Regular (87 octane)	9.875
Premium (97 octane)	11.625

*Quotations are for octanes shown. Prices usually vary with octane ratings within the regular, premium, and aviation grades.

NATURAL GASOLINE*

Group 3:

Grade 26-70	4.5

Breckenridge:

Grade 26-70	4.0

*If 26-70 natural is considered as 100%, prices for lower-vapor-pressure grades increase 2.5% for each unit drop in Reid vapor pressure down to and including 16 lb. Prices for grades below 16 lb. may vary slightly by areas or plants.

KEROSINE AND DISTILLATE

Mid-Continent (Group 3):

Kerosine 42-44	10.00
Diesel oil (58 d.i. and above)	9.75
Distillate No. 1	9.75
Distillate No. 2	9.00

Gulf Coast (cargoes):

Kerosine 41-43	9.125
Distillate No. 2	8.625

New York Harbor (barges):

Kerosine 41-43	10.20
Distillate No. 2	9.70
Diesel fuel, 48-52 d.i.	10.05

Caribbean area (cargoes):

Distillate No. 2	8.625

WAX (LB.)

Oklahoma (Group 3):

132-135 A.m.p. (semi-refined) in tank car	6.50

New York (export):

126-130 A.m.p. crude-scale (solid in bags or barrels)	7.35

★Denotes change from previous week.

RESIDUAL FUEL (BBL.)

Mid-Continent (Group 3):

Residual fuel (max. 1% S)	$1.50

Gulf Coast (cargoes):

Bunker C fuel	$2.00

New York Harbor (barges):

Bunker C fuel	$2.37

Caribbean (cargoes):

Bunker C	$2.00

California (rack):

Bunker C fuel, Los Angeles	$2.10

LUBRICATING OILS

Mid-Continent (Group 3):

150-160 bright stock, solvent refined, 0-10 pp., 95 v.i.	23.0
200 vis. neutral oil, solvent refined, 0-10 pp., 95 v.i.	20.5

Pennsylvania Grade:

145-155 vis. at 210, bright stock, 8 color, 25 p.t.	22
200 vis. neutral (180° at 100°), 25 p.t.	21

CRUDE-OIL PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.	★Okla-homa*	Gulf Coast Tex.†	West Tex.‡ N.M.	Wyo. (sour)
14-14.9	$1.86	....	....	....	....
15-15.9	1.95	....	....	....	$1.81
16-16.9	2.04	....	....	....	1.86
17-17.9	2.13	....	....	....	1.91
18-18.9	2.23	....	....	....	1.96
19-19.9	2.32	....	....	....	2.01
20-20.9	2.41	$2.52	....	$2.62	2.06
21-21.9	2.50	2.55	....	2.64	2.11
22-22.9	2.60	2.58	....	2.66	2.16
23-23.9	2.69	2.61	$3.44	2.68	2.21
24-24.9	2.78	2.64	3.46	2.70	2.26
25-25.9	2.87	2.67	3.48	2.72	2.31
26-26.9	2.96	2.70	3.50	2.74	2.36
27-27.9	3.06	2.73	3.52	2.76	2.49
28-28.9	3.11	2.76	3.54	2.78	2.54
29-29.9	3.16	2.79	3.56	2.80	2.59
30-30.9	3.22	2.82	....	2.82	2.63
31-31.9	3.27	2.85	....	2.84	2.67
32-32.9	3.33	2.88	....	2.86	2.71
33-33.9	3.38	2.91	....	2.88	2.75
34-34.9	3.44	2.94	....	2.90	2.79
35-35.9	3.49	2.97	....	2.92	2.83
36-36.9	3.55	3.00	....	2.94	2.87
37-37.9	3.60	3.02	....	2.96	2.89
38-38.9	....	3.04	....	2.98	2.91
39-39.9	....	3.06	....	3.00	2.93
40-44.9	....	3.08	....	3.02	2.95

*Top prices on other Oklahoma (sweet) postings vary from $3.15 to $3.01 a barrel. †Low cold test crude. ‡Sour.

Effective dates of broad changes: California, 9-30-58: East of California, January 3-10, 1957; Pennsylvania Grade, 6-18-58.

FLAT PRICES

Louisiana:

Sweet Lake	$3.00
Ville Platte	3.30

Texas:

East Texas	3.25
Conroe	3.53
Van	3.08

Pennsylvania Grade:

Bradford	3.90
Middle District	3.72
Southwest Pennsylvania	3.43
West Virginia	3.25
Buckeye Grade	3.25

Illinois Basin	3.00

Canada:

Leduc-Woodbend	2.67
Redwater (Alta.)	2.56
Smiley (Sask.)	2.33
Pembina	2.52

FOREIGN

Venezuela:

★ Cumarebo, 48°-49.9°, Tucupido	3.66
★ San Joaquin, 41°-41.9°, Puerto La Cruz	3.25
Oficina, 35°-35.9°, Puerto La Cruz	3.05
Tia Juana medium, 26°-26.9°, Amuay*	2.55
Quiriquire, 16.0°-16.4°, Caripito	2.15
Lagunillas heavy, flat, Las Piedras*	2.10
Bachequero, flat, 15°-16°, Las Piedras*	1.93

Prices for all crudes of 24° or lighter vary 2 cents per degree change, up or down. All crudes heavier than 24° vary 2.5 cents per half-degree gravity change.

*Also available at La Salina at 3 cents per barrel less.

Middle East, Persian Gulf (cargoes, f.o.b. lifting port):

Arabian, 36.0°-36.9°, Ras Tanura	$2.12
Iranian, 34.0°-34.9°, Bandar Masur	2.04
Iranian, 34.0°-34.9°, Ababan	1.99
Iraq, 35.0°-35.9°, Fao	1.98
Kuwait, 31.0°-31.9°, Mina-al-Ahmadi	1.85
Qatar, 41.0°-41.9°, Umm Said	2.23

Middle East, E. Mediterranean:

Arabian, 36.0°-36.9°, Sidon	2.49
Iraq, 36.0°-36.9°, Tripoli, Banias	2.49

Far East (cargoes, f.o.b. Lutong, Sarawak):

Seria Light, 37°	2.75

TANKER RATES PER LONG TON
(Latest reported spot fixtures)

Carib.-U.S.N.H., clean (ATRS —20%	$2.20
Carib.-U.S.N.H., dirty (USMC —60%	1.08
Carib.-Sweden, dirty (Scale—47.5%) (18s. 4d.)	2.57
P.G.-Lisbon dirty (Scale—45%) (28s. 9d.)	4.03

CLASSIFIED ADVERTISING

...your market place for the oil and gas industry

RATES:

UNDISPLAYED CLASSIFIED 26c a word one issue. 10% discount three or more consecutive issues. $5.00 minimum charge. Blind Box in our care nine words. Payable in advance.

DISPLAY CLASSIFIED
$18.00 a column inch one issue . . .
10% Discount three or more consecutive issues.

Address Classified Advertising Material: The Oil and Gas Journal, P. O. Box 1260, Tulsa 1, Okla.

EXCEPT . . .

WESTERN STATES: (California, Washington, Oregon, Idaho, Nevada, Utah, and Arizona) Write: Classified Departments, Inc., The Oil and Gas Journal, 4041 Marlton Ave., Los Angeles 8, Calif. Phone: AXminister 2-0287.

FOR SALE EQUIPMENT

1955 I-R 600 GYROFLO compressor, 2520 total hours, 6-71 GMC diesel, hose and connections, excellent condition, mounted on K-7 truck. $9,000.00 net, can finance. Richard Travis, Box 1347, Phone CHapel 2-8331, Grand Junction, Colorado.

TANKS FOR SALE: Nine 10' x 40' used horizontal riveted Steel tanks, 23,000 gallon capacity. Four 7' x 35' used Horizontal riveted steel tanks, 10,000 gallon capacity. At Sandyville, West Virginia. Rogers & Wright Company, P. O. Box 1572, Charleston 26, W. Va., Tel. DI—3-0171.

NEW CASING

MILL PRICE—LESS 10%

3,600 ft. 7" 23#, LT&C, N-80, R-3
800 ft. 7" 26#, LT&C, N-80, R-3
3,700 ft. 7" 29#, LT&C, N-80, R-3
600 ft. 7" 32#, LT&C, N-80, R-3
9,000 ft. 2⅞" 6.5#, T&C, N-80, R-2

All API Youngstown seamless in perfect condition.

Rothschild Oil Co.

12354 Lakeland Rd.,
Santa Fe Springs, Calif.
Phone RAymond 3-3357

9—Vert. Pfaudler Blue glass welded steel tanks 9' dia. x 13'6" high, dished heads, ⅜" thickness.
2—CO-2 Horiz. high pressure welded steel tanks 3'6" dia. x 68'.
1—6' dia. x 18' Horiz. high pressure carbon dioxide tank.
1—Vert. welded steel tank 4'3" high, shell heads 1½" thickness, 455# pressure.
3—Horiz. stainless steel tanks 9' dia. x 24', ¼" shell, ⅜", dished heads, used for beer.
3—Horiz. A. O. Smith Blue Glass welded steel tanks, 9' dia. x 24', ⅜" shell, heads dished heavier, used for beer.
1—Horiz. welded Butane tank 8' x 40', ½" shell, heads may be heavier dished.
1—Horiz. welded Butane tank 11'6" dia. x 19' shell ½" heads dished, may be heavier.
1—Horiz. welded steel tank 8' dia. x 40', ⅝" shell, 1¼", dished heads.
1—Horiz. Propane welded steel tank 6' dia. x 28', Code U-69, 200# pressure.
1—Horiz. Propane welded steel tank 7' dia. x 43', Code U-69, 200# pressure.
7—Horiz. welded steel tanks 9' dia. x 34'6", 1⅛" shell, 1¼" dished heads, Code RU-68 for unfired pressure vessels, 250# pressure, stress relieved, all x-rayed.
1—10,000 gallon tank car 100,000# capacity. Hundreds of other tanks, all sizes, for pressure and ordinary storage up to 120,000 barrels. Also steel buildings, new and used steel pipe, tubing up to 36" diameter.

A. GREENSPON PIPE CO., INC.
8890 Ladue Road—St. Louis 24, Mo.
PArkview 7-8885.

FOR SALE EQUIPMENT

USED DRILL PIPE, 4½". Approximately 1,900 Ft. Located at Hominy, Okla. $1.75 per Ft. Phone GIbson 7-0323 or Write John Heard & Co., 624 So. Cheyenne, Tulsa.

SALES AND RENTALS. Used cable drilling and fishing tools, casing, production equipment; from the Southwest's largest stock of oil field supplies. Degen Pipe and Supply Co., Tulsa.

BARGAIN: 160—3½" x 4¾" OD Slightly Used Reed Tubing Tool Joints. Call or write Graham-Michaelis Drilling Company, Wichita, Kansas.

200,000 FT. LINE PIPE 10¾ No. 1 S. H. 40.80# L. W. 20,000 ft. 8⅝ Seamless 19.63#, like new. Phone DI. 3-9563, Box 1215, Tulsa.

GASOLINE PLANTS

Portable for Essentially Unattended Operation

Gas Compressors — Financing — Rentals

Cherokee Steel, Inc.

TULSA, OKLA.

Box 1049 **CHerry 2-6291**

Are You

CONTEMPLATING AIR DRILLING

Or
Interested In Getting Information On Air Drilling Equipment?

We have the know-how through experience and have Le Roi proven Air Drilling Equipment to meet most requirements—any capacity—pressures up to 1500#—Rental with option of purchase—Sales.

Write or phone, we will gladly arrange for a meeting at your convenience.

MIDWESTERN ENGINE & EQUIPMENT CO., INC.
(LE ROI DISTRIBUTORS)
4645 Southwest Blvd. **P. O. Box 1886**
Phone: HI 6-6144
TULSA, OKLAHOMA

28,000' NEW 4½" O.D. seamless mechanical tubing, weight 15.20# per ft., price 80c ft. loaded on cars or trucks Sherman, Texas. New price over $2.00 ft. mill. Jones-Laughlin Steel Corp. make, 100,000# tensile strength.

BB&G Oil Company

P. O. Box 1858 Tulsa

FOR SALE EQUIPMENT

GAS COMPRESSORS, 3 Type 80 Cooper Twin Engine Horizontal 2-stage units, w/piping, gate valves. $3,000 each. P. O. Box 1353, Tulsa, Oklahoma.

C-250, C-150 IDEAL PUMPS, LROU, NKU Waukesha Engines. Complete Ideal No. 50 Rig. Lloyd Darlington, National Supply, Torrance, Calif.

FOR SALE—Pole Trailer, dual-wheels, electric brakes, good condition. J. F. Smith, 302 Masonic Building, Phone 3404, Shawnee, Oklahoma.

FOR SALE OR BARTER

35,000 feet new, prime, seamless linepipe at Belgian mill, 6⅝" OD x 18.97#, API, 5-L, Grade B, monogrammed, Moody inspected, double random, plain end, bevelled. Will trade for 5½" casing, EUE tubing, structural steel or other commodities.

BARON TUBE COMPANY
225 ROGERS STREET, N.E.
ATLANTA 17, GA.

LIQUIDATION

DX-SUNRAY REFINERY
ALLEN, OKLA.

5—FURNACES, Chrome tubes
7—TOWERS, Vacuum 9'6" x 48'
Fractionator 2' x 34', 16 trays
Strippers, 4' x 60'—4'6" x 28'—5' x 24'
Reactor 3' x 23'—475 psi.
16—HEAT EXCH.—80 to 480 sq. ft.
50—PUMPS, steam and centrifugal
4—BOILERS—112, 177, 250 H.P.
15 TANKS—1,000 to 15,000 bbl.
250 NEW Croloy 5 furnace tubes 2⅜" to 4" OD.
GAS Generator Set 400 KW 3/60/2300

Phone or write for inventory

Heat & Power Co., Inc.
306 Thompson Bldg., Tulsa, Okla.

FOR SALE EQUIPMENT

SCINTILLATOR COUNTER for oil prospecting Airborne-Carborne Mt. Sopris Model No. SC12BA. Cost over $3,000.00. Will sell for $1250. Write Box 62, Tarrytown, N. Y.

FOAMITE: Firefoam, single powder type, LaFrance original sealed 50 lb. cans, our low price $1.85/can. Material guaranteed perfect. LaFrance Foamite Generators, single powder portable type, model 15, w/hoppers, unused, $25.00 each. Wallach, 727 Walnut St., Philadelphia 6, Pa.

WALKER-NEER SPUDDER: 32 special. Light plant, dog house, tools complete. Clean—ready to work. Phone 20 or write Box 788, Drumright, Oklahoma.

WELL DRILLS - CORE DRILLS. Everything for well and core drilling in both new and used equipment at money saving prices. Fishing tools rented. Send for bulletins. Pressey & Son, Pueblo, Colo.

500,000 FT. 8" PIPE. Wt. 28#, Lapweld plain end beveled. 20 or 40 ft. lghs. Also 35,000 ft. 40# 10" all No. 1. Indiana-Ohio Pipe Co. Phone 3-4674. P. O. Box 323—Decatur, Indiana.

6½" X 3¾" X 3¾" X 3" X 12" 8 SVG-3 Beaird Ingersoll-Rand packaged compressor plant (550 HP). Spare 4" cylinder. Only 3 years old and in very good condition. Rated 3.0 MMCFD at 2,200 PSI discharge pressure. Availability due to discontinuation of gas-pressure maintenance program. Located Bradley West Field in southwest Arkansas. Contact Benedum-Trees Oil Company, 704 Milam Building, San Antonio, Texas.

GAS BOOSTER, Skid Unit, V-12 Climax Engine, Fuller Rotary Compressor, complete with cooling. $5500. W. J. McMeans, Marietta, Oklahoma.

LINE PIPE. 10,000' 2" standard. 35' to 40' lengths. Plain end. Good body. Clean inside and out. Straight ready to lay. 20c. M. J. Regan Pipe Co., Coffeyville, Kans.

PIPE FOR SALE—100,000' 2" I.D. tubing, 11½ thread, R-1, cleaned ID & OD, weight 3.75-4.00 No. 1 grade @ 20c. 250,000' ¾" sucker rods 7/8" box and pins @ 5c. 5,000' 13# 6⅝" casing @ 60c. Contact H. L. Goodman, Ford Bros., P. O. B. 452, Eldred, Pa.

30 G-R TWIN SECTION Heat Exchangers. Types CSS-248 and DSS-248, 500# WP. $100 each. Box K-960, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

The following complete rotary drilling rigs:

One U-15 powered by 2 NKU Waukesha engines

Two U-15 powered by 3 KKU Waukesha engines

One U-15 powered by 2 LRO Waukesha engines

For further information or inspection of the rigs contact:

HENSON DRILLING COMPANY
P. O. Box 2192
ABILENE, TEXAS
Telephones: ORchard 2-4112
ORchard 3-3071

EQUIPMENT WANTED

WANT TO BUY up to 7,000' of good used 5½" Drill Pipe with Reed Super-shrink Grip Tool Joints preferably. Contact Roy L. Bulls, DRake 3-8307, Amarillo, Texas, or write Apt. #79, Greenacres, Amarillo, Texas.

HELP WANTED

WANTED: Chief Chemist for 16,000 barrel refinery. Excellent opportunity for man with proper qualifications. Box K-945, The Oil and Gas Journal, Tulsa, Oklahoma.

GENERAL SALES MANAGER wanted by aggressive petroleum marketing company with headquarters in Tulsa. Must be experienced in sales promotion, well known in the industry and have full knowledge of specifications of petroleum products as well as pricing schedules. Some traveling necessary. Excellent opportunity with chances for advancement for right man. Please reply Box K-855, The Oil and Gas Journal, Tulsa, Oklahoma, giving age, qualifications, references and expected starting salary. All replies will be treated strictly confidential.

HELP WANTED

PETROLEUM ENGINEER with chemical background for petroleum market development position. Excellent opportunity with rapidly expanding division. Submit resume to Personnel Manager, General Mills, Inc., Chemical Division, Kankakee, Illinois.

CHEMICAL ENGINEER

Position open for MS or PhD Chemical Engineer with three to five years industrial experience. Research will involve studies relative to the effect of chemicals on oil producing formations.

Requirements:	Excellent academic background. Excellent work record.
Location:	Research Center at Tulsa, Oklahoma.

Address inquiry to:

Director of Technical Placement
Jersey Production Research Company
1133 North Lewis Avenue
TULSA 10, OKLAHOMA

CHEMICAL ENGINEER

P.H.D.

5 YEARS MINIMUM RESEARCH EXPERIENCE IN PETROLEUM, NATURAL GAS OR PETROCHEMICAL
AGE TO 45
EXCELLENT OPPORTUNITY IN OUR NEW RESEARCH AND DEVELOPMENT DEPARTMENT
LOCATED IN EL PASO, TEXAS

APPLY IN WRITING
ENCLOSING COLLEGE TRANSCRIPT AND DETAIL EXPERIENCE RESUME TO

Employment Supervisor

EL PASO NATURAL GAS COMPANY
P. O. BOX 1492
EL PASO, TEXAS

HELP WANTED

WANTED: Petroleum Engineer. Must be able to take complete charge of operating and managing natural gas properties in Illinois. Give complete resume of experiences and qualifications. References required. Box K-939, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMIST

PhD.—PHYSICAL OR ORGANIC
5 Years Minimum Research Experience
Age to 45
Excellent Opportunity In Our New Research and Development Department Located in El Paso, Texas
Apply In Writing Enclosing College Transcript and Detail Experience Resume to EMPLOYMENT SUPERVISOR

El Paso Natural Gas Company
P. O. Box 1492
EL PASO, TEXAS

PETROLEUM ENGINEERS

Opportunity for experienced production, drilling, and reservoir engineers. Require BS or MS degree and 5 to 8 years drilling, production, reservoir engineering or research experience. Salary commensurate with experience. Attractive company benefits. Assignments in Saudi Arabia and New York.

Write giving full particulars of personal history and work experience to:

Recruiting Supervisor, Box 306

ARABIAN AMERICAN OIL COMPANY
505 PARK AVENUE, NEW YORK 22, N. Y.

To an Outstanding Processing Engineer . . .

Mail in confidence to:
The Oil and Gas Journal—Engineering Dept.
P. O. Box 1260—Tulsa 1, Okla.

I am interested in your processing position in Houston, and am mailing an experience resume.

Name .....

Address .....

City ..... State .....

WE'D like to offer you an unusual opportunity to prove your ability, advance in your career, and make a significant contribution to petroleum processing.

Specifically, there is a position open for a young engineer on the editorial staff of The Oil and Gas Journal as a refining editor in our Houston office.

In this position . . .

- You'll have plenty of opportunity to prove your ability as you write, solicit, and edit technical articles on the newest, most important development in your field each week.
- You'll have a truly unusual opportunity to advance in your career because you'll constantly broaden your knowledge of your field—both through the information you handle and the contacts you make.
- You'll have every opportunity to contribute work of high significance to your profession, both in the technical articles you write and in the help you'll give outstanding authors in communicating their technical know-how to an industry audience of 42,000 oil men.

This is a permanent staff job. And speaking of staff, we've carefully handpicked ours to be not only the best in the business but also the friendliest, most stimulating, and most fun to work with.

In short, we offer you a challenging, interesting, rewarding job. How about telling us what you offer—degree, college record, experience, aptitude for writing, writing experience, samples, etc.? Put it in a letter addressed to Engineering Department, Box 1260, Tulsa. We'll be happy to hear from you.

HELP WANTED

FOREIGN EMPLOYMENT: Lists about 40 U. S. oil companies, 30 drilling contractors, operating abroad, showing where apply foreign jobs, $5. cash. OIML Co. Box 2003, Tulsa, Okla.

STRATIGRAPHER - SEDIMENTOLOGIST, M.S. or Ph.D. Minimum 4 years experience. Be able to do independent creative geology. Rocky Mountain Area. Box K-940, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED FOR FOREIGN EMPLOYMENT Middle East, Africa with independent drilling contractor drilling superintendents, maximum age 50, tool pushers, diesel rig mechanics maximum age 45, steam and power drillers, water well drillers maximum age 40, material-administrative coordinators. Box K-914, The Oil and Gas Journal, Tulsa, Oklahoma.

Chemical Engineer

The Superior Oil Company has an immediate opening in Midland, Texas, for a young graduate Chemical Engineer for natural gas work. This position offers an excellent long range opportunity. Applicants should submit transcript, resume of background, and photo to

Mr. J. J. Jamison,
P. O. Box 1900, Midland, Texas,

or to the Employee Relations Department,
400 Oil & Gas Building,
Houston, Texas.

SITUATION WANTED

CONSTRUCTION MANAGER, SUPERINtendent. Thorough experience all details organization through operation, both in Arctic and Tropics, under difficult conditions. Box K-947, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, 32, single, speak Spanish and German. 2 years foreign, 2 years U. S. experience. Prefer Latin America or Europe. Box K-890, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMIST—33, 7 years production—Refinery Laboratory experience—Spanish, English. Resume on request. Box K-942, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICS SUPERVISOR: Eight years experience in Texas, Louisiana, Mississippi, Rocky Mountain area, Australia and Venezuela. Box K-928, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY ENGINEER—M.S. Degree. Fifteen years active experience in operations, engineering, management, in refining and natural gasoline. Desire responsible position with aggressive organization. Will consider sales. Box 31R 150, 4041 Marlton Ave., Los Angeles 8, Calif.

YOUNG ATTORNEY with nine years experience, oil and gas law, desires connection with firm or corporation. Will furnish resume on request. Box K-961, The Oil and Gas Journal, Tulsa, Oklahoma.

CONTROLLER. Texas CPA, attorney. Ten years public accounting with National Firm. Contact clients, supervise staffmen four to ten concurrent audits. Heavy petroleum, also wholesaling, stock brokerage, estates, trusts experience. Stockholder, SEC reports; taxes; operations analysis; acquisitions and mergers; accounting research. Directed audit staff training; prepared training case studies and staff textbook on petroleum accounting. Taught college accounting. Familiar with business literature and sources of information; can summarize in meaningful reports. Box K-943, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN—Seven years major company experience, 2½ years as independent. Thorough knowledge Rocky Mountain Area. Desire position with independent or small company. Box K-901, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPELINE ENGINEER, age 36, eleven years experience crude, products and gas pipeline design, construction and operation, registered, now residing in South America, desires domestic or foreign position. Box K-957, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATION WANTED

GEOPHYSICS SUPERVISOR: Eight years experience in Texas, Louisiana, Mississippi, Rocky Mountain area, Australia and Venezuela. Box K-928, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST WISHES WEALTH
Wants chance to show unmatched talents as Oil Geologist or Engineer. Extensive engineering experience and academic training of superior quality. Box 31 R 189, The Oil and Gas Journal, 4041 Marlton Ave., Los Angeles 8, Calif.

GAS ENGINEER—8 years experience, process, evaluation, construction, desires position preferably with independent. Box K-950, The Oil and Gas Journal, Tulsa, Oklahoma.

OPERATIONS MANAGER: Age 43 with 24 years foreign and domestic experience capable and experienced in co-ordinating drilling, production, field engineering, and field geology. Good organizer and at best on difficult jobs. Background includes experience as district manager of drilling company where contact work as well as active management was required. Top references. Box K-951, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST—Eight years diversified experience with Major Company. Degree in Geology. Presently employed. Reply Box K-956, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST—eleven years diversified seismic experience, domestic and foreign. Will relocate. Box K-955, The Oil and Gas Journal, Tulsa, Oklahoma.

SUPERINTENDENT, production, gasoline or pipeline; 46, available immediately, 28 years experience production, cable tool drilling, pipe-line, gas systems and plants. Last ten years gas plants in West Texas. Box K-959, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER, B.S.M.E., experience as petroleum engineer with major and design engineer of oilfield equipment. Prefer Tulsa area. Box K-958, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

MODERATELY PRICED LEASES IN heart of industrial southwestern Ontario adjacent to producing oil and gas wells and on structure. Write Box K-949, The Oil and Gas Journal, Tulsa, Oklahoma.

800 ACRES of State Leases in Bent Co., Colo. Contact: Alice W. Burns, 930 East Main Street, Clarion, Pa. Telephone CA 6-7503.

SEE A. L. BOWLES, Rollow Bldg., Box 947, Ada, Okla., for attractive drilling deal in Seminole Co., Okla. Ready. Maps of the area.

PRODUCTION FOR SALE

50-ACRE Oil Lease with one Salt Water Disposal Well and three Oil Wells producing 35 barrels per day. Has pipe line hook-up. PRICE $65,000.00. Phone 554, Sedan, Kansas.

BUSINESS OPPORTUNITIES

WANT ASSOCIATE for manufacturing and selling LACT and DESANDER equipment Gulf Coast. Thomson, 1342 Jones, San Francisco. PRospect 5-3944. Box K-954, The Oil and Gas Journal, Tulsa, Oklahoma.

SMALL TECHNICAL SERVICE COMPANY FOR SALE: Established 13 years in Permian Basin. Owns premises. Efficient organization. Priced at four times annual earnings, plus appraised value of real estate. Running expense underwritten by oil company subscription. Reason for selling: Other interests. Box K-936, The Oil and Gas Journal, Tulsa, Oklahoma.

REAL ESTATE

SUB LEASE

Desirable Office Space
3,000 Sq. Ft. or More on One Floor
NATIONAL BANK OF TULSA

CONTACT H. E. CANADA
P. O. Box 2158
Dallas 21, Texas
Telephone RI—7-7011

BOOKS

COMPARE OIL COMPANIES

Just published—a 57-page book giving financial comparisons of 85 U. S. oil companies. See how your company compares with competitors. Gives capitalization, production, cash flow, earnings, dividends. Also included: World Oil Map in color, complete data on Middle East holdings. Prepared by the publishers of **Oil Statistics Bulletin** and **Canadian Oil Reports**—originally for outside investors and now being made available to oil-company personnel. Only $3.85.

OIL STATISTICS COMPANY, Inc.
Dept. OG-1, Babson Park 57, Mass.

LEASE AND DRILLING BLOCKS

FOR $35,000, WILL SELL ½ interest in 10,000 acre lease and 5,000 ft. Pennsylvanian test well drilled on structure in Lincoln County, N. M. Box K-946, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR DRILLING DEALS in Texas, contact Ogden Oil Company, P. O. Box 464, Ph. EL 2-3352, Taylor, Texas.

Offer 50,000 to 80,000 acres Copper River Basin, Alaska. Leases secured before May 2, 1957. Or will make drilling deal.

W. C. Berry

P. O. BOX 1858 TULSA, Phone DI 3-6141

MANAGEMENT SERVICE

MANAGEMENT SERVICE

Specializing since 1924 in

ACQUISITIONS
and
DIVESTMENTS

Assistance to Management in Expansion and Diversification

Mr. Emanuel Lazarus Stone
3220 Hudson Blvd., Jersey City 6, N. J.
Telephone SWarthmore 5-0201 **Cable Address: Elmaston**

ELECTRIC LOG CABINETS

FOR ECONOMICAL FILING of full-size electric logs, most geologists prefer Kraftbilt E-34 4-drawer cabinet. Two compartments to each drawer with separate follow blocks make this cabinet handy, economical. for catalog 58-B. Ross-Martin Co., P. O. Box For filing reduced electric logs, geologists use Kraftbilt E-28 8-drawer cabinet. Send 900-A, Tulsa, Okla.

MONEY RAISING

FINANCIAL CONTACTS, Underwriters Brokers, Private Finders of Capital reached No shopping. Confidential. FREE ENTERPRISE ASSOCIATES, 817—51st St., Brooklyn, N. Y.

MAPS

WE HAVE AVAILABLE the most accurate oil maps and information for those interested in Cuba's oil developments. Write to M. A. Noguera, P. O. 336, Havana, Cuba.

PRODUCTION WANTED

WANTED: Oil properties. 100 to 5,000 barrels daily in Oklahoma and Kansas. Morris Sitrin, P. O. Box 1160, Tulsa, Okla.

PRINCIPALS with moderate funds interested in shallow, low gravity, stripper production from sandstone reservoirs. Send all data. Box K-911, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL PRODUCTION

Will pay premium prices for landowners' oil or gas royalties, overriding royalties and producing leases. Interested in properties producing 50 barrels to 10,000 barrels oil per day. Please submit sufficient information for prompt consideration.

REPLY BOX 31 R 148,
THE OIL AND GAS JOURNAL,
4041 Marlton Ave., Los Angeles 8, Calif.

BUSINESS SERVICE

Delaware Corporation formed and serviced. American Guaranty & Trust Company, P. O. Box 487, Wilmington, Delaware.

BUSINESS SERVICE

RADIOACTIVITY OIL SURVEYS—combined with Magnetometer Results will outline Oil Field limitations; also useful information for locating new drill sites. For details NUSCO OIL CO., 3311 Swiss, Dallas—TA 6-5303.

IF you change your address

please be sure to let us know promptly. It takes time to correct the stencil addressing plate. And we don't want you to miss copies of THE JOURNAL.

Also . . . . . .

be sure to give us both

(1) your OLD address
(including company)

and

(2) your NEW address

We need them both to make the change. Also confirmation of your company connection and position.

The Oil and Gas Journal
Box 1260 Tulsa, Okla.

Do You Read Oil and Gas Journal Classified Pages?

. . . So do most of our other Subscribers!

That's why these pages are called:

The Market Place Of The Oil Industry

—to buy or sell equipment—to find personnel or a position—to buy or sell production, royalties, acreage or real estate—for business opportunities—or to publicize professional services, maps, or field records.

And the cost is reasonable:—26¢ per word or $18. per column inch. Minimum: $5. for word ad or 1 in. for display ad. 10% reduction for running same copy in three or more consecutive issues. This ad is 2 columns wide and 4 inches deep, or 8 column inches.

We will be glad to help you phrase your classified ad or give you the cost of running it. Send your inquiry or copy now:

WRITE: The Oil and Gas Journal 211 South Cheyenne Tulsa, Oklahoma

ADVERTISERS . . . In This Issue

A

ACF Industries, Incorporated, Valve Division . . . 164
Advanced Oil Tools, Inc. . . . 318
Aldrich Pump Company, The . . . 81
Allis-Chalmers . . . 252, 253
Aluminum Co. of America . . . 9
Amercoat Corporation . . . 196
American Chain & Cable
American Chain Division . . . 265
Helicoid Gage Division . . . 192
American Cyanamid Company, Refinery Chemicals Department . . . 29
American Iron & Machine Works Co. 322
American Meter Company . . . 46, 47
American Steel & Wire Division . . . 80
Ampco Metal, Inc. . . . 266
Appleton Electric Company . . . 72
Arkla Air Conditioning Corp. . . . 216
Armstrong Machine Works . . . 251
Atlantic Refining Company, The . . . 45
Autocar Division of the White Motor Company . . . 278

B

B and W Incorporated . . . 213
Baash-Ross Division of Joy Manufacturing Company . . . 239
Baker Oil Tools, Inc. . . . 110
Barco Manufacturing Company . . . 268
Bethlehem Steel Company . . . 194
Bethlehem Supply Company . . . 17
B-I-F Industries . . . 259
Bingham Pump Company . . . 36, 37
Black, Sivalls & Bryson, Inc. . . . 242
Bonney Forge & Tool Works . . . 326
BrakeSol, Inc. . . . 286
British Petroleum Company Limited, The . . . 173
Bucyrus-Erie . . . 218
Burgess-Manning Company . . . 328
Byron Jackson Tools, Inc., A Subsidiary of Borg-Warner . . . 51

C

Cabot Shops, Inc. . . . Inside Back Cover
Cameron Iron Works, Inc. . . . 66
Canadian Western Pipe Mills Limited 290
Catawissa Valve & Fittings Co. . . . 306
Cathodic Protection Service . . . 261
Chance Co., A. B. . . . 286
Chicago Bridge & Iron Company 170, 171
Chiksan Company . . . 247
Christensen Diamond Products . . . 179
Cities Service Oil Co. . . . 34
Clark Bros. Co. One of the Dresser Industries . . . 67
Classified Advertising . . . 339, 340, 341, 342
Cleveland Trencher Company, The . . . 274
Climax Engine Manufacturing Division of Waukesha Motor Company . . . 224
Colorado Fuel and Iron Corp., Wickwire Spencer Steel Division . . . 19
Columbian Steel Tank Co. . . . 263
Comptoir Franco-Belge d'exportation des Tubes d'acier . . . 65
Connelly, Inc. . . . 216
Continental-Emsco Company, a Division of The Youngstown Sheet and Tube Company . . . 280 through 285
Continental Motors Corp. . . . 243
Cook Machinery Co., Inc. . . . 178
Cooper-Bessemer Corp., The . . . 162, 163
Core Laboratories, Inc. . . . 296
Crosby-Laughlin Division American Hoist & Derrick Company . . . 178
Crose Manufacturing Co., Inc., M. J. . . 158

D

Dean Hill Pump Company . . . 258
De Laval Steam Turbine Co. . . . 94

Delta Air Lines ... 275
Delta Drilling Company ... 49
Detroit Controls Division American-Standard ... 312
Detroit Diesel Engine Division, General Motors Corp. ... 53
Dillon, Read & Co., Inc. ... 309
Dorr-Oliver Incorporated ... 114
Dowell ... 190, 191
Drilling and Exploration Company of Delaware, Inc. ... 105
Drilling & Service, Inc. ... 324
Drilling Equipment Manufacturing Co. 317
du Pont ... 75, 76

E

Eastman Chemical Products, Inc. ... 169
Eastman Oil Well Survey Company ... 56
Edward Valves, Inc. ... 62, 63
Electric Machinery Mfg. Company ... 16
Electro Rust-Proofing Corp. ... 287
Electro-Motive Division General Motors ... 204, 205
Elliott Motors, Inc. Ken ... 181
Emco Brass Manufacturing Co., Ltd. 278
Ensign Carburetor Company ... 20
Esso Research and Engineering Company 7

F

Fairbanks, Morse & Co. ... 238
Farrel-Birmingham Co., Inc. ... 74
Fibercast Company a Division of the Youngstown Sheet and Tube Company 245
First National Bank in Dallas ... 32
First National Bank of Shreveport, The 274
First National Bank & Trust Co. of Tulsa, The ... 264
Fisher Governor Company ... 52
Flexitallic Gasket Company ... 177
Flint Steel Corporation ... 257
Franks Division of Cabot Shops, Inc. ... 276, 277
Fuller Company ... 83
Fulton & Company, R. H. ... 214

G

Garrett Corporation, The ... 220
General American Transportation Corporation ... 227, 269, 270, 271, 272
General Paint Company ... 217
General Services Administration ... 314
Geophysical Service, Inc. ... 299
Glidden Company, The ... 208
Goodrich Industrial Products Company, The B. F. ... 5
Grace & Co., W. R. Davison Chemical Division ... 58
Graver Tank & Mfg. Co., Inc. ... 219
Gray Tool Company ... 241
Griscom-Russell Co., The ... 188
Grove Valve and Regulator Company 10
Guiberson Corporation ... 38

H

Haering & Co., Inc., D. W. ... 209
Halliburton Oil Well Cementing Co. ... 12, 13, 307
Hammond Iron Works ... 78
Harley Sales Company ... 321
Harris, Upham & Co. ... 314
Helicoid Gage Division, American Chain & Cable Co. ... 192
Hercules Tool Company ... 202
Hill, Hubbell and Company Division of General Paint Corporation ... 232
Homco ... 101
Houston Contracting Company ... 274
Hudson Engineering Corporation ... 183
Hughes Tool Co. ... Back Cover
Hughey & Phillips, Inc. ... 216
Humble Oil & Refining Co. ... 230

I

Infilco Incorporated ... 186
Ingersoll-Rand ... 27
International Business Machines Corporation ... 231

J

Jefferson Chemical Company, Inc. ... 26
Jenkins Bros. ... 33
Jensen Bros. Mfg. Co., Inc. ... 308
Johnston Testers, Inc. ... 97
Jones & Laughlin Supply Division 288, 289

K

Kellogg Co., The M. W. ... 15
Kemp Mfg. Co., C. M. ... 79
Kidde & Company, Inc., Walter ... 256
Kinzbach Tool Co., Inc. ... 212
Koch Engineering Company, Inc. 254
Koenig Iron Works, Inc. ... 216
Kohler Co. ... 212
Kolor-Kut Products Co. ... 317
Kuhns Brothers Co., The ... 311

L

LeGrand Rochester Limited ... 313
Leland Equipment Co. ... 315
LimiTorque Corporation ... 89
Linde Company, A Division of Union Carbide Corporation ... 86
L-O-F Glass Fibers Company ... 82
Lone Star Steel Company ... 160
Lummus Company, The ... 112, 113

M

Mack Trucks, Inc. ... 244
Manning, Maxwell & Moore, Inc. ... 68
Marbon Chemical Division of Borg-Warner ... 48
Marley Company, Inc., The ... 98
Marsh Instrument Co. ... 29
McDonald Company, B. F. ... 252
McKissick Products Corporation ... 35
Meadows, Inc., W. R. ... 328
Mid-Continent Supply Company 246, 267
Midwest Piping Company, Inc. ... 14
Mission Mfg. Company ... 93
Moore Corporation, Lee C. ... 96
Morse Chain Company ... 40
Motorola Communications & Electronics, Inc. ... 61
Murray Iron Works Company ... 84

N

National Airoil Burner Co., The ... 290
National Bank of Tulsa ... 108
National Foam System, Inc. ... 225
National Lead Company ... 293, 294, 295
National Supply Co., The ... 11, 233, 234, 235, 236
National Tank Company ... 344
Naylor Pipe Company ... 226
Nelson Electric Mfg. Co. ... 106
Newport News Shipbuilding and Dry Dock Company ... 223
Norris Manufacturer, Inc., W. C. ... 4
North American Car Corporation ... 59
Norwood Controls Unit, Detroit Controls Division of American-Standard ... 166, 167
Northwest Engineering Company ... 57

O

Oakite Products, Inc. ... 222
Ohio Injector Company ... 95
Oil States Rubber Co. ... 257
Oil Well Supply Division ... 6
Oliver Corporation, The ... 1
Orbit Valve Company ... 184

P

Pacific Pumps Inc. ... 104
Paris Distributor, Inc., Henry H. ... 206
Parkersburg Rig & Reel Co. ... 303
Peerless Pump Division of Food Machinery & Chemical Corporation ... 207
Penn Controls, Inc. ... 279
Pennsylvania Flexible Metallic Tubing Company, Inc. ... 192
Petroleum Distributing Co. ... 211
Pfizer & Co., Inc., Chas. ... 201
Philadelphia Gear Corporation ... 89
Phoenix Manufacturing Company ... 221
Pipe Line Technologists, Inc. ... 291
Pittsburgh Plate Glass Company ... 69
Polyken Sales Division of The Kendall Company ... 90
Porter Company, Inc., H. K. Forge and Fittings Division ... 320
Powell Valves ... 91
Procon Incorporated ... 92

R

Radio Corporation of America ... 88
Rector Well Equipment Co., Inc. ... 18
Reda Pump Company ... 262
Refinery Engineering Company ... 44
Republic Rubber Division of Lee Rubber & Tire Corp. ... 77
Republic Steel Corporation 21, 22, 23, 24
Ridge Tool Company, The ... 262
Rockwell Manufacturing Company ... Inside Front Cover
Rockwood Sprinkler Company ... 237
Roebling's Sons Company, John A. ... 304
Rolatape, Inc. ... 278
Rollway Bearing Company, Inc. ... 228
Ross-Martin Co. ... 217
Ryerson & Son, Inc., Joseph T. ... 302

S

Sachse Electric Inc. ... 317
Sargent Engineering Corporation ... 180
Servco ... 43
Shaffer Tool Works ... 310
Shell Development Company ... 87
Sherman Products, Inc. ... 30
Sikorsky Aircraft ... 85
Skelly Oil Company ... 333
Southwestern Graphite Co. ... 103
Standard Oil Company of California ... 175
Sun Ship Building & Dry Dock Company ... 260

T

Taylor Forge & Pipe Works ... 54, 55
Technical Oil Tool Corporation ... 327
Tennessee Gas Transmission Company 107
Texas Employers Insurance Association 73
Thermoid Company ... 305
Thomas Flexible Coupling Co. ... 325
Thompson Pump Company ... 314
Thompson Tank & Manufacturing Co., Inc. ... 202
Thornhill-Craver Co. ... 31
Timken Roller Bearing Company Steel and Tube Division ... 39
Torrington Company, The ... 210
Trane Company, The ... 248, 249
Transcontinental Gas Pipe Line Corporation ... 265
Trerice Co., H. O. ... 286
Tretolite Company A Division of Petrolite Corporation ... 100
Tube Turns, Inc. ... 41, 42

U

United States Borax & Chemical Corporation, Pacific Coast Borax Company Division ... 323
United States Rubber Company ... 64
United States Steel Corporation—Oil Well Supply Division ... 6
Universal Atlas Cement Co. ... 229
Universal Oil Products Co. ... 60, 70, 71

V

Valley Electric Corp. ... 264
Vogt Machine Co., Henry ... 50

W

Waldron Corp., John ... 99
Wallace & Tiernan Incorporated ... 287
Warren Petroleum Corporation ... 157
Waukesha Motor Company ... 8, 240
Welex, Inc. ... 102
Well Instrument Developing Co. ... 317
Western Geophysical Company of America ... 301
Wheeling Machine Products Company 316
White Diesel Engine Division, The White Motor Company ... 25
Whitmor Homebuilders Inc. ... 255
Wickwire Spencer Steel Division, Colorado Fuel and Iron Corp. ... 19
Williams Brothers ... 292
Wisconsin Motor Corporation ... 319
W-K-M Division of ACF Industries Incorporated ... 164

● National Water Stabilizer and Clarifier with Prene-Sealed Redwood Gravity Filters in open system waterflood.

National®

WATER STABILIZER AND CLARIFIER

National's Raw Water Stabilizer and Clarifier is designed for rapid and thorough chemical treatment of disposal or flood water, through circulation of slurry followed by short relatively motionless periods to permit settling of precipitants. Sludge is drawn off automatically through a valve at the bottom of the tank. The result is a stabilized clear water being delivered to the filters. Volume of water to be treated determines the size of the Stabilizer and Clarifier since a particle of water remains approximately two hours in the tank. The Unit is available in Bolted Steel Tanks, Prene-Sealed® Redwood and Rezo-Glas® Plastic Tanks. Internals are available of hot dipped galvanized after fabrication or Rezo-Glas non-corrosive plastic material, or steel with special coatings.

24' x 16' National Water Stabilizer and Clarifier with chemical building.

30' x 16' National Water Stabilizer and Clarifier with Forced Draft Aerator and Oxidation pits in open system waterflood in Illinois.

These units are available in a wide range of capacities and sizes from over 50 Warehouses in the United States, Canada and Venezuela.

Write for Tank Topics - "Water Treating, Flood and Disposal"

It's a National®

NATIONAL TANK COMPANY

TULSA, OKLAHOMA

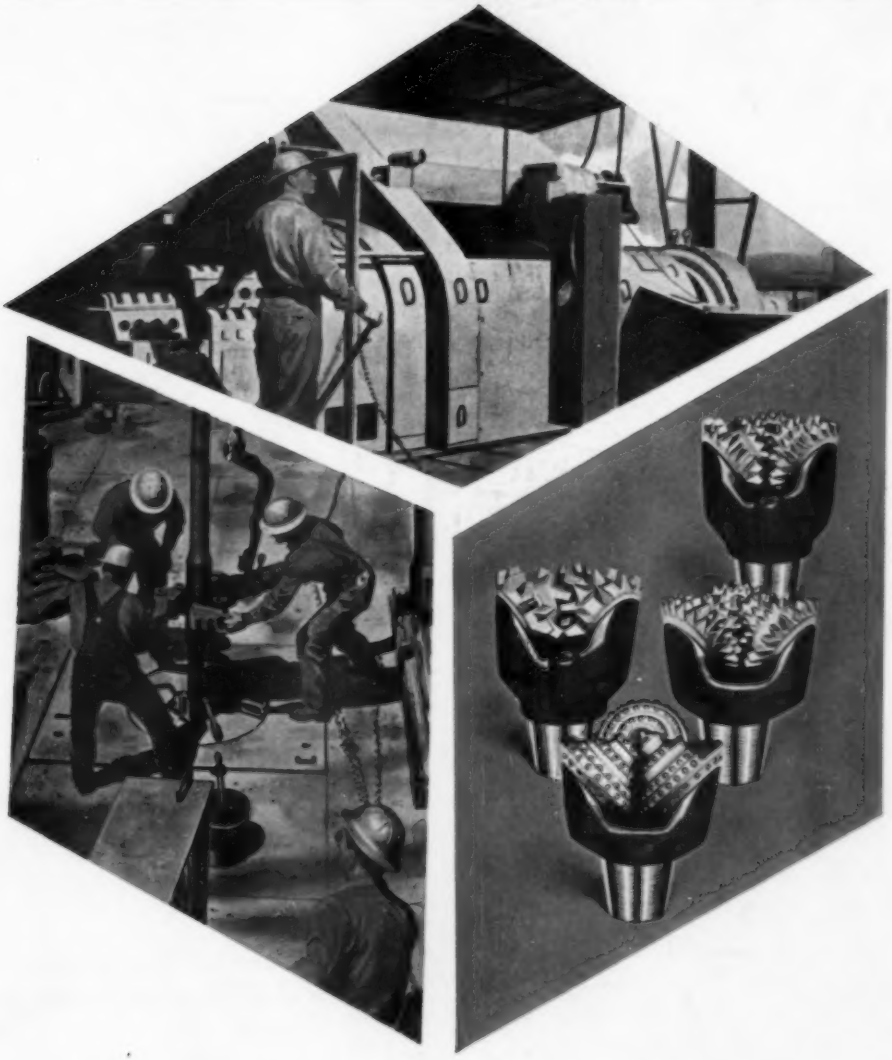
CABOT LOOKS AHEAD!

With Field Engineered Units TODAY
BACKED BY Parts and Service Tomorrow!

- Cabot quality pumping units with field proven low maintenance.
- Cabot's trucks deliver units to lease location.
- Parts and 24 hour service thru Cabot-Franks Service Depots.
- See your J & L man today—make your next unit Cabot.

Beam balanced units 3,000 to 11,000 lbs. capacity.
Adjustable crank units 7,000 to 32,000 lbs. capacity.
Air balanced units to 42,000 lbs. capacity.
Hydraulic long stroke units to 36,000 lbs. capacity.

OIL FIELD PUMPING EQUIPMENT
CABOT
PAMPA, TEXAS
FRANKS
DIVISION OF CABOT



Your best combination

- **Experienced Crews**
- **Proved Equipment**
- **Hughes Rock Bits**

Wherever you drill, you can count on this combination to get your well down faster and more economically. A Hughes representative—backed by 50 years of rock bit research and experience—is always available to help you set up a bit program that will enable you to make the most efficient use of your drilling equipment.